The Dissertation Committee for Wendy Ann Machalicek certifies that this is the approved version of the following Dissertation:

The Use of Video Tele-conferencing to Train Teachers to Assess the Challenging Behaviors of Children with Autism Spectrum Disorders

Committee:

Mark F. O'Reilly, Supervisor

Karrie Shogren

Audrey Sorrells

Susan Natasha Beretvas

Jeff Sigafoos

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Wendy Ann Machalicek, B.S.; M.Ed.

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The Use of Video Tele-conferencing to Train Teachers to Assess the Challenging Behaviors of Children with Autism Spectrum Disorders

Wendy Ann Machalicek, Ph.D.

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Supervisor: Mark F. O'Reilly

Educational legislation requires the implementation of a functional assessment for students with disabilities who engage in challenging behavior that could lead to a change in their educational placement (IDEA Amendments, 1997; IDEA, 1990; IDEA Improvement Act, 2004). Research has shown that teachers can implement functional assessments with intensive instruction and performance feedback, yet this training can be difficult to carry out in educational settings with limited resources to provide such supervision. In the health care field, video tele-conferencing (VTC) is used to overcome specialist shortages and provide supervision. Such technology might be used to deliver training and performance

feedback to teachers learning to assess challenging behavior, but few studies have reported the use of VTC in educational settings. The purpose of this study was to evaluate the use of performance feedback delivered via VTC on the acquisition and maintenance of functional analysis procedures by 6 teachers. Concurrent multiple baseline designs across teacher-student dyads with embedded multi-element designs were used to evaluate the effects of performance feedback delivered via VTC on the percentage of functional analysis procedures implemented correctly. Performance feedback via VTC was provided once per week over an average of 6 weeks until each teacher implemented the procedures of each functional analysis condition (i.e., escape, attention, and play) at 100% accuracy over three consecutive sessions. Results indicated that performance feedback delivered via VTC was effective to train the teachers to independently implement functional analysis conditions. These results were maintained at or near criterion performance four weeks following the termination of performance feedback for 4 teachers. Each teacher rated performance feedback delivered via VTC positively with respect to the training procedures and the outcomes of training. The results and limitations of this study, and relevant areas for future research are discussed.

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CHAPTER 1

INTRODUCTION

Children and youth with intellectual disability and autism spectrum disorders (ASDs) commonly engage in challenging behaviors including self-injury, aggression, stereotypy, and property destruction (Baghdadli, Pascal, Grisli, & Aussiloux, 2003; Conroy, Dunlap, Clarke, & Alter, 2005; Emerson et al., 2001; Horner, Carr, Strain, Todd, & Reed, 2002; Kiernan & Kiernan, 1994; McClintock, Hall, & Oliver, 2003; Murphy, Hall, Oliver, & Kissi-Debra, 1999; Odom, Brown, Frey, Karasu, Smith-Canter, & Strain, 2003). Without appropriate treatment, serious challenging behaviors tend to persist over time and can restrict educational and social opportunities (Murphy, Beadle-Brown, Wing, Gould, Shah, & Holmes, 2005; National Research Council, 2001; Oliver, Murphy, & Corbett, 1987; Reichle, 1990). Challenging behavior can hinder a teacher's attempts at instruction (Carr, Taylor, & Robinson, 1991) and teachers report increased levels of "emotional burnout" when challenging behavior is dealt with ineffectively (Hastings & Brown, 2002).

Fortunately, a sizable literature base provides information regarding the implementation and effectiveness of evidence-based assessments and interventions to decrease the challenging behavior of children and youth with intellectual disability and ASDs (Conroy et al., 2005; Didden, Duker, &

Korzilius, 1997; Hanley, Iwata, & McCord, 2003; Horner et al., 2002; Kates-McElrath, Agnew, Axelrod, & Bloh, 2007; Kurtz et al., 2003; Scotti, Evans, Meyer, & Walker, 1991). The effective treatment of challenging behavior includes a functional behavior assessment (FBA) to identify the social consequences maintaining the student's challenging behavior and the subsequent development of an intervention based on the assessment results (Didden et al., 1997; Scotti et al., 1991). The implementation of an accurate FBA might be considered the most important step in the treatment of challenging behavior, because interventions are more effective when derived from the results of a FBA (Didden et al., 1997).

Educational legislation requires completion of a FBA and subsequent development of a behavior intervention plan (BIP) or modification of an existing BIP for students with disabilities whose challenging behavior results in a change of educational placement for more than ten school days or when a series of removals constitute more than ten school days. Schools must also conduct a FBA and create a BIP when the student's behavior interferes with his or her learning or the learning of classmates (IDEA, 1990; IDEA Amendments, 1997; IDEA Improvement Act, 2004). IDEA 2004 does not provide guidance on the FBA process and state departments have interpreted this requirement differently (Weber, Killu, Derby, & Barretto, 2005). States have implemented FBAs that

include one or more of the following strategies: direct observation and description of the challenging behavior and ecological context; review of records; the use of checklists regarding environmental circumstances; interview of the student and others; team meetings; scatterplots; antecedent-behavior-consequence (ABC) analysis; functional analysis observation forms; reinforcer identification; development of a hypothesis regarding the causes of challenging behavior; and experimental functional analysis. The accuracy of a FBA relies on the appropriate selection and correct implementation of the assessment strategies that will determine the social consequence(s) maintaining a student's challenging behavior. Thus, IDEA 2004 requires schools to have trained staff available to conduct FBAs, develop and modify BIPs.

However, the appropriate assessment and treatment of challenging behavior is sometimes a difficult task for teachers, because procedures are often more complex than those instructional strategies teachers use to teach a new skill. To properly assess and intervene on challenging behavior, a teacher must operationally define target behaviors; understand the functional relationships between challenging behavior and social consequences, and implement antecedents and consequences with reliability. Without a basic understanding of the social consequences that maintain a child's challenging behavior, teachers might respond to challenging behavior inconsistently and in ways that could

jeopardize appropriate treatment (Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995). Therefore, teachers learning to implement evidence-based practices such as FBAs may require intensive training or ongoing supports (Applegate, Matson, & Cherry, 1999; Ayres, Meyer, Erevelles, & Park-Lee, 1994; Campbell & Halbert, 2002; Gersten, Vaughn, Deshler, & Schiller, 1997; Johnston & O'Neill, 2001; Kehle & Bray, 2004; Nelson, Roberts, Rutherford, Mathur, & Aaroe, 1999; Safran & Safran, 1988).

Classroom supports provided to teachers and other staff often includes hands on experience with feedback from a knowledgeable supervisor (Demchak, 1987; Feldman & Dalrymple, 1984; Harchick, Sherman, Hopkins, Strouse, & Sheldon, 1989; Hastings, 1996; Hill & Dagnan, 2002; Jahr, 1998; Repp, Felce, & de Kock, 1987). Such supervision offers teachers an opportunity to practice complex skills with immediate feedback and error correction (Lang & Fox, 2003; West, Jones & Stevens, 2006). In teacher preparation programs teachers' benefit from carefully supervised fieldwork paired with coursework (Brownell, Ross, Colón, & McCallum, 2005). Thus, teacher preparation programs rely on face-to-face supervision to train teachers and to evaluate the outcomes of their program (Brownell et al., 2005). However, teacher preparation programs might face logistical challenges in providing such time intensive supervision to teachers. For instance, at The University of Texas at Austin, postgraduate special education

students are often placed in schools located in several cities, necessitating considerable travel for the practicum supervisor. The time lost to travel between sites can necessarily limit the total amount of supervision available to each student. Researchers have called for more efficacious ways to provide such time intensive training to teachers (National Research Council, 2001; Scheuermann, Webber, Boutot, & Goodwin, 2003). Further research is needed to evaluate the use of available technology to more efficiently supervise and instruct pre service teachers who are learning to assess and treat challenging behavior.

Recent advances in telecommunication technology such as video tele-conferencing and the increased availability of broadband Internet access may provide supervisors innovative tools with which to better prepare and support special educators working with children and youth with severe disabilities who engage in challenging behavior. Other fields use video tele-conferencing (VTC) to extend the reach of specialists where shortages exist and to supervise professionals implementing complicated tasks that require feedback (Hilty, Luo, Morache, Marcelo, & Nesbitt, 2002). VTC enables two or more parties to communicate using two way video and audio transmissions. The delivery of health care via VTC to patients who reside in remote communities with limited access to specialists is increasingly common (Hilty et al., 2002). VTC technology has facilitated psychiatric assessments, psychotherapy and the supervision of

trainee psychotherapists (Gammon, Sorlie, Bergvik, & Sorensen Hoifodt, 1998; Zarate, Weinstock, & Baer, 1997). VTC has also facilitated follow up care for older adults following discharge from a hospital (Tousignant, Boissy, Corriveau, & Moffet, 2006). Given that the special education field is facing similar difficulties (e.g., specialist shortages, continued need to supervise and instruct teachers), VTC might provide teacher preparation programs a new way to address some of these issues.

Despite the potential advantages of delivering instruction and supervision to teachers via VTC, the findings of recent research in the health care field are mixed. Empirical studies with reliable baseline data are generally absent in the literature and some studies report less positive findings that indicate the need for additional research (Monnier, Knapp, & Frueh, 2003). Moreover, little videoconferencing research has been conducted in educational settings for the purposes of training teachers to implement educational assessments or interventions. The few studies conducted in education settings or with students with disabilities report positive findings (Barretto, Wacker, Harding, Lee, & Berg, 2006; Ludlow & Duff, 2002; Machalicek et al., in press a; Machalicek et al., in press b). To date, three studies describe the use of VTC to support an educational assessment with children with intellectual disabilities or ASDs. Barretto et al. (2006) used VTC via a state's fiber-optic network to support novice clinicians

implementing functional analyses for children who engaged in challenging behavior. The research of Machalicek and colleagues focuses on evaluating the use of consumer ready VTC equipment (i.e, laptop computer, web camera, broadband Internet) to implement common educational assessments (i.e., preference assessment, functional analysis).

Machalicek et al. (in press a) evaluated the feasibility and effectiveness of consumer ready VTC equipment to implement functional analyses to identify the consequences maintaining the challenging behavior of two young children with an ASD. In this study, post-graduate students experienced in functional analysis procedures provided feedback via VTC to inexperienced post-graduate students implementing the functional analyses. The results of the functional analyses indicated that both children engaged in challenging behavior to obtain attention and escape from academic demands. Neither child engaged in clinically significant levels of challenging behavior during play conditions of the functional analysis. Classroom interventions based on the results of functional analyses conducted via VTC decreased challenging behavior and increased task engagement for both children. The results of this study suggest that VTC is a potentially effective technology for training teachers to assess the challenging behavior of children with severe disabilities.

The purpose of this dissertation was to extend previous research conducted by Machalicek et al. (in press a). First, this study evaluates the effects of immediate performance feedback when provided via consumer ready VTC equipment on six teachers' acquisition and maintenance of functional analysis procedures. Secondly, this dissertation assessed the perceptions of teachers' regarding the social validity of using VTC to deliver performance feedback during functional analyses conducted in special education classrooms.

CHAPTER 2

EMPIRICAL REVIEW OF INTERVENTIONS TO TRAIN TEACHERS TO ASSESS AND INTERVENE ON CHALLENGING BEHAVIOR

Educational legislation and recent school based intervention research support the implementation of FBAs to identify the causes maintaining a child's challenging behavior and the subsequent development of an assessment based intervention to decrease the challenging behavior of students with intellectual disabilities and ASDs. However, teachers may lack sufficient knowledge, support and training to implement such evidence-based strategies in their classrooms. It would seem, therefore, that a review of recent staff training literature is needed to identify effective strategies for training teachers to implement evidence-based assessments and interventions to decrease challenging behavior. Such a review might identify variables that contribute to a teacher's acquisition, generalization and maintenance of evidence-based practices for the classroom assessment and treatment of challenging behavior.

Past staff training literature reviews have evaluated interventions aimed at training staff to assess and implement intervention plans for persons with intellectual disabilities who engaged in challenging behavior (Demchak, 1987;

Feldman & Dalrymple, 1984; Harchick et al., 1989; Jahr, 1998; Phillips, 1998; Repp et al., 1987). Considerable research has been devoted to the examination of staff training in residential and institutional settings (Alvero, Bucklin, & Austin, 2001; Demchak, 1987). However, no review has specifically evaluated interventions used to train teachers to assess and treat challenging behavior.

Teachers and other school professionals differ from direct care staff in several ways that might affect the effectiveness and acceptability of training strategies. Teachers generally have more education and more specialized experience than direct care staff. Teachers also experience greater autonomy in their daily work and teach within classrooms. Training teachers might require different instructional content, strategies, and methods of delivery than those effective for training direct care staff working in residential or institutional settings.

The present chapter aims to provide a comprehensive review of instructional strategies used to train pre and in service teachers and other school professionals to implement assessments and interventions aimed at decreasing the challenging behavior of students with intellectual disabilities and ASDs.

Methods

Studies were included in this review based on four criteria. Each study: (a) included pre or in service teachers or other school professionals (e.g., school

psychologists, applied behavior analysis therapists) as participants; (b) utilized a single subject design; (c) was published in a peer reviewed journal between 1997 and 2007; and (d) applied an intervention in an effort to train participants to implement an assessment of challenging behavior or implement an intervention to decrease the challenging behavior of students with intellectual disabilities or ASDs. Studies that applied an intervention to teach students an appropriate behavior to replace challenging behavior were also included in this review. Studies that used adult actors to portray challenging behavior during interventions were included in this review if the portrayed behaviors included topographies of challenging behavior common to students with intellectual disabilities or ASDs (e.g., stereotypy, self-injurious behavior). Studies in which teachers or other school professionals were trained to assess or intervene on the challenging behavior of students *without* disabilities were not included.

Electronic searches were completed using ERIC, PsychINFO, and MEDLINE. First, searches were carried out using terms such as; “staff training” or “teacher training” and “challenging behavior”, “intellectual disabilities”, “developmental disabilities” and “in service” and “challenging behavior” and “positive behavior support” and “teacher training”. Approximately 222 studies were retrieved from this database search. The abstracts of these articles were then read to ascertain which studies addressed relevant topics of staff training. Next,

six special education journals were hand searched by the first author to identify additional studies published between the years of 1997 and 2007 (i.e., *Journal of Intellectual Disability Research*; *Journal of Applied Behavior Analysis*; *Journal of Autism and Other Developmental Disabilities*; *School Psychology Review*; *Focus on Autism and Other Developmental Disabilities*; and *The Journal of Positive Behavior Interventions*). These journals were selected based on already identified articles that fit the criteria for inclusion. The abstracts of the articles within these journals were read to identify pertinent studies for inclusion into this review. Selected studies were examined in greater detail to identify whether they met the aforementioned inclusion criteria. Finally, the reference sections of included studies were searched to identify additional studies for inclusion. A total of 11 studies (n=45 participants) were identified that met the inclusion criteria.

The studies were classified into two categories according to the intended outcome of the staff training. The two categories of staff training were (a) assessment of challenging behavior and (b) implementation of interventions to decrease challenging behavior. A study was classified as assessment of challenging behavior if the intervention evaluated a participant's ability to implement a descriptive or experimental FBA to identify the consequences maintaining a student's challenging behavior.

A study was classified as implementation of interventions to decrease challenging behavior if the intervention evaluated a participant's ability to implement an intervention designed to decrease a student's challenging behavior. Several studies trained participants to both assess challenging behavior and to implement interventions designed to decrease challenging behavior (Durand, 1999; Hetzroni & Roth, 2003; Watson, Ray, Sterling Turner, & Logan, 1999). The findings of these articles are discussed within each of the two categories.

For each evaluated study, Table 1 describes the following five variables: (a) the number and type of participant (i.e., pre or in service teacher or other school professional) included in the study as well as their educational background (e.g., special education, general education, psychology); (b) the desired outcome(s) of the study; and (c) the strategies used to train staff. The findings are not reported in Table 1, because the majority of studies (*n*=9) reported positive findings. Two studies reported mixed findings (Codding, Feinberg, Dunn, & Pace, 2005; Seligson Petscher & Bailey, 2006). Positive meant that all the participants experienced some gain in knowledge or ability from baseline levels during intervention. Mixed meant that, although one or more participants experienced some gain in knowledge or ability, one or more participants did not.

Table 1. Studies listed according to categories with number, type, and educational background of participants, desired outcome(s), and training strategies.

Studies	*n*	Type of Participant	Desired Outcome(s)	Training Strategies
I. Assessing challenging behavior				
*Durand (1999)	4	In service special educators, related staff.	Participants independently implement analog FA[a] with target students.	I. Discussion, direct instruction of FA[a] procedures.
Erbas, Tekin-Iftar, & Yucesoy (2006)	5	In service special educators.	Participants independently implement analog FA[a] with target students.	I. Lecture, video simulation of FA[a] procedures, quiz. II. Performance feedback using video of participant's implemented FA[a].
*Hetzroni & Roth (2003)	4	In service special educators.	Participants independently implement ABC[b] forms with target students.	I. Lecture, *in vivo* simulations, discussion of target student's IEP[c] and data.

Table 1. *(continued).*

Studies	*n*	Type of Participant	Desired Outcome(s)	Training Strategies
I. Assessing challenging behavior				
Iwata et al. (2000)	11	Pre service psychology undergrad. students.	Participants independently implement analog FA[a] with actors.	I. Lecture, video simulation of FA[a] procedures, quiz. II. Performance feedback using video of implemented FA[a].
Moore & Fisher (2007)	3	In service special educators.	Participants independently implement analog FA[a] with target students.	I. Simulation of FA[a] conditions with experimenter playing role of target student and *in vivo* practice of FA[a] conditions with target student.
Wallace, Doney, Mintz-Resudek, & Tarbox (2004)	3	Pre service special, educator, general educator, school psychologist.	Participants independently implement analog FA[a] with target students.	I. Lecture, video simulation of FA[a] procedures, role-play w/scripted actors w/feedback.

Table 1. *(continued).*

Studies	*n*	Type of Participant	Desired Outcome(s)	Training Strategies
I. Assessing challenging behavior				
*Watson, Ray, Sterling Turner, & Logan (1999)	3	In service special educators & special education teaching assistant.	Participants independently implement analog FA[a] with target students.	I. Modeling of FA[a] procedures with narration. II. Participants implemented FA[a] procedures with feedback.
II. Implementing interventions to decrease challenging behavior				
Codding, Feinberg, Dunn, & Pace (2005)	5	In service special educators.	Participants independently implement antecedent & consequence interventions with target students.	I. Weekly performance feedback following observations of participant implementing intervention.
Dib & Sturmey (2007)	3	In service special education assistants.	Participants independently implement DTT[d] with target students.	I. Performance feedback with modeling following participant implementation of DTT[d].

Table 1. *(continued).*

Studies	*n*	Type of Participant	Desired Outcome(s)	Training Strategies
II. Implementing interventions to decrease challenging behavior				
*Durand (1999)	4	In service special educators, related staff.	Participants independently implement FCT[e] intervention with target students.	I. Discussion, direct instruction. II. Assistance developing intervention.
*Hetzroni & Roth (2003)	4	In service special educators.	Participants independently implement FCT[e] intervention with target students.	I. Lecture, *in vivo* simulations, discussion of target student's IEP[c] and data. II. Assistance developing FCT[e] intervention, practice with target students.
Mancina Tankersley, Kamps, Kravits, & Parrett (2000)	1	In service special educator.	Participant independently implements self management intervention with target student.	I. Task analysis of intervention procedures, video simulation & modeling of instruction, performance feedback.

Table 1. *(continued).*

Studies	*n*	Type of Participant	Desired Outcome(s)	Training Strategies
II. Implementing interventions to decrease challenging behavior				
Seligson Petscher & Bailey (2006)	2	In service special education teaching assistants.	Participants independently implement token economy with target students.	I. Prompting, self-monitoring, & feedback II. Removal of prompting III. Prompting device (i.e., pager).
*Watson, et al. (1999)	3	In service special educators, special education teaching assistant.	Participants independently implement DRA[f]/escape extinction with target students.	I. Researcher modeled intervention. II. Participants implemented intervention with performance feedback.

*Article appears in both categories.

[a] Functional analysis.

[b] Antecedent-behavior-consequence.

[c] Individualized education program.

[d] Discrete trial teaching.

[e] Functional communication training

[f] Differential reinforcement of alternative behavior.

Negative meant that no participants in the study benefited from the intervention or that one participant gained in one skill and not in another. No study reported negative findings.

The remainder of the chapter is organized into the three sections of (a) results, (b) discussion, and (c) future research. The results section presents an overview of the outcomes of the research studies according to training category (i.e., training staff to assess challenging behavior or training staff to implement interventions to decrease challenging behavior). Within each training category, two studies are described in detail to illustrate the instructional strategies that typify a category. All studies are summarized in Table 1 so that readers can refer back to them as needed. The discussion section evaluates the outcomes of the 11 studies (n=45 participants) in regard to the: (a) overall effectiveness of the strategies used to train staff to assess and intervene on challenging behavior, (b), measurement of dependent and independent variables, and (c) the social validity of the interventions. The final section (i.e. future research) offers suggestions for future research.

Overview of Studies by Category

Assessing Challenging Behavior

Seven studies trained teachers and related staff to assess challenging behavior to determine the social consequence(s) maintaining it (Durand, 1999;

Erbas, Tekin-Iftar, & Yucesoy, 2006; Hetzroni & Roth, 2003; Iwata et al., 2000; Moore & Fisher, 2007; Wallace et al., 2004; Watson et al., 1999). Six studies trained teachers to assess challenging behavior using analog functional analysis methodologies (Durand, 1999; Erbas et al., 2006; Iwata et al., 2000; Moore & Fisher, 2007; Wallace et al., 2004; Watson et al., 1999). Others studies involved staff in the assessment of challenging behavior using descriptive assessments (Durand, 1999; Erbas et al., 2006; Hetzroni & Roth, 2003). The majority of studies used multicomponent interventions including performance feedback (see Erbas et al., 2006; Wallace et al., 2004). The majority of studies (*n*=9) involved actual students who engaged in challenging behavior to train teachers while other studies involved actors to play the role of students (Iwata et al., 2000; Wallace et al., 2004).

Erbas et al. (2006) evaluated the effects of an intervention package on five in service teachers and one pre service student teacher's acquisition of analog functional analyses in a private school. Each teacher had between three and fourteen years experience teaching children who engaged in challenging behavior, but none had conducted a functional analysis prior to intervention. The intervention was divided into two phases consisting of (a) lecture, videotaped simulations, discussion, and quiz, and (b) and individualized consultation, implementation of functional analysis conditions, and subsequent performance

feedback. First, teachers attended a lecture on functional analysis methodology. Prior to this lecture, teachers were asked to read written materials describing the theoretical basis of functional analysis and methodology. Next, the teachers watched a videotaped simulation of the correct implementation of functional analyses conditions (i.e., attention, demand, play, and tangible). Following a second viewing, teachers discussed each of the test conditions with researchers. Third, the teachers completed a 20-item quiz adapted from Iwata et al. (2000). Each teacher took the quiz until achieving a score of at least 90 percent correct. Finally, during the final phase, each teacher met with researchers to define their student's target behavior(s) based on classroom observation, implement functional analysis interview forms with teacher aides and parents of students, develop a hypothesis for the targeted challenging behavior(s), and implement a functional analysis with the targeted student. Teachers implemented functional analysis conditions with their targeted students and received performance feedback from the researcher immediately following each functional analysis condition. Researchers provided feedback to teachers based on their videotaped performance. Feedback consisted of error identification (e.g., You made a mistake. What should you have done after the problem behavior?), error correction (e.g., As soon as the student exhibited the problem behavior, you should have told her don't hit yourself, you can hurt yourself), and praise.

Feedback continued until teachers conducted each functional analysis condition without error. Following intervention, each teacher's correct implementation of the functional analysis conditions increased.

Wallace et al. (2004) trained two in service teachers and a school psychologist to implement functional analyses in public schools. None of the participants had previously taken a course in behavior analysis or conducted a functional analysis. The intervention was implemented in two phases consisting of a three-hour workshop, and teacher implementation of functional analysis conditions with subsequent performance feedback. In the first phase, participants attended a workshop consisting of lecture, watching a videotaped simulation of functional analysis conditions, and role-play of functional analysis conditions. In the second phase, participants implemented functional analysis conditions with an actor playing the role of a student who engaged in self-injurious behavior. If a participant failed to implement a functional analysis condition with greater than 90% accuracy, a researcher provided performance feedback to the participant following the condition. Feedback consisted of error correction (e.g., make sure you physically guide the individual to complete the task if he or she has not responded to the model and has not engaged in the target behavior). Following performance feedback, the participant implemented the functional analysis conditions a second time. One of the participating teachers and the school

psychologist correctly implemented functional analysis conditions without the addition of performance feedback. This teacher independently conducted a functional analysis with a student who engaged in self-injury during follow up assessment. The third participant's implementation of functional analysis conditions improved only after receiving performance feedback.

Implementing Interventions to Decrease Challenging Behavior

Seven studies aimed to train staff to implement interventions to decrease challenging behavior (Codding et al., 2005; Dib & Sturmey, 2007; Durand, 1999; Hetzroni & Roth, 2003; Mancina, Tankersley, Kamps, Kravits, & Parrett, 2000; Seligson Petscher & Bailey, 2006; Watson et al., 1999). Studies in this category used a variety of instructional strategies to train teachers to implement interventions aimed at decreasing a student's challenging behavior. However, the majority of studies trained teachers using performance feedback consisting of praise and error correction as a single component intervention (Codding et al., 2005), or in combination with other strategies. Performance feedback has been combined with modeling of the correct instructional procedures (Dib & Sturmey, 2007; Mancina et al., 2000; Watson et al., 1999), direct instruction (Durand, 1999; Hetzroni & Roth, 2003), role-play (Hetzroni & Roth, 2003), and video simulation (Mancina et al., 2000). In another study, researchers used personal pagers to

prompt teachers to deliver tokens as part of a class wide token economy intervention (Seligson Petscher & Bailey, 2006).

Teachers were trained to implement discrete trial teaching (DTT) procedures (Dib & Sturmey, 2007), and to ignore challenging behavior that occurred during a demand (i.e., escape extinction) while differentially reinforcing alternative behavior (DRA) (Watson et al., 1999). Other studies taught teachers to implement functional communication training (FCT), or self-management strategies (Durand, 1999; Hetzroni & Roth, 2003; Mancina et al., 2000). Codding et al. (2005) trained teachers to deliver antecedents and consequence interventions for students as specified by their BIP (Codding et al., 2005).

Codding et al. (2005) trained five in service, private school teachers to implement interventions specified by a student's BIP using performance feedback. Each teacher was enrolled in a postgraduate special education program at the time of the study. At the time of the study, each participant was trained to implement general and student-specific aspects of BIPs. Teachers first reviewed student BIPs with the researcher, and then watched the researcher implement the prescribed antecedent (e.g., transition warning, providing choices) and consequence procedures (e.g., time-out, guided compliance) with the target student. Finally, teachers implemented the antecedent and consequence procedures in their classroom with subsequent performance feedback from the researcher.

Performance feedback was provided every other week and consisted of praise for correct implementation of BIP procedures, and error correction (e.g., review of components observed and explanation of how component should have been implemented) for inaccurate or incomplete implementation of BIP procedures. Following intervention, teacher implementation of the consequence procedures improved for each of the five participants. Teacher implementation of the antecedent procedures improved for four of the five teachers. These effects were maintained for up to fifteen weeks post intervention.

Dib & Sturmey (2007) evaluated the effects of modeling and performance feedback on the acquisition of discrete trial training (DTT) for three assistant, private school teachers. Participants implemented DTT procedures according to a provided task analysis of teacher behaviors with subsequent performance feedback from researchers. Performance feedback consisted of praise and error correction. The correct implementation of DTT procedures was also discussed and modeled for participants. Following intervention, each participant's implementation of DTT improved and resulted in decreased student stereotypy during DTT sessions.

Discussion

Instructional Strategies Used in Interventions

Studies used a variety of instructional strategies to train teachers to assess challenging behavior and implement interventions including: (a) lecture and discussion, (b) videotaped simulation of correct procedures, (c) *in vivo* modeling and role-play of procedures, (d) performance feedback, and (e) training participants to self-monitor their performance. Of the aforementioned strategies, performance feedback has received the most attention as an effective strategy for modifying staff behavior (see Alvero et al., 2001 for a review). Approximately one half of the studies followed antecedent (e.g., lecture, modeling, watching a video) or consequence (e.g., tactile prompts) strategies with performance feedback (Erbas et al., 2006; Iwata et al., 2000; Mancina et al., 2000; Seligson Petscher & Bailey, 2006; Wallace et al., 2004; Watson et al., 1999). These studies have defined performance feedback as the delivery of praise following correct implementation of instructional procedures. Feedback has been provided *in vivo* and as teachers watch their videotaped performance (Erbas et al., 2006; Iwata et al., 2000; Seligson Petscher & Bailey, 2006).

Researchers have suggested that performance feedback could serve an operant function (i.e., reinforcement, antecedent cue, establishing operation) (Alvero et al., 2001; Codding et al., 2005). Codding and colleagues (2005) have

suggested that social consequences such as praise and corrective feedback may have differential effects on teacher behavior. During staff training, teachers may engage in the correct behavior to elicit praise from supervisors or coworkers, or to avoid error correction or punitive actions from supervisors. Teachers may also behave in ways that will obtain tangible rewards such as pay raises or vacation time. Praise for correct responses may act as a positive reinforcer on teacher's correct implementation of procedures while the withdrawal of corrective feedback following correct implementation of procedures may serve to negatively reinforce teacher behavior.

However, the relationship between teacher behavior and intervention strategy is likely to be more complicated than current functional analysis methodologies would allow. Teachers may experience extensive private events during training and might engage in complex verbal behavior with others in ways that could also affect their behavior. For instance, a teacher who has implemented an intervention procedure correctly may experience a temporary boost to his or her self-confidence. Methodological issues notwithstanding, a more thorough knowledge of the ways in which social consequences may effect teacher behavior will expand the current staff training literature.

Additionally, the instructional strategies reviewed here are those summarized in past reviews of staff training (Demchak, 1987; Feldman &

Dalrymple, 1984; Harchik et al., 1989; Phillips, 1998; Repp et al., 1987; Sturmey, 1998). These findings suggest that one of the next steps for researchers is to evaluate the individual contributions of individual strategies on teacher knowledge and competencies. Researchers have repeatedly encouraged the component analysis of staff training interventions (Koegel, Russo, & Rincover, 1977; Jahr, 1998; Parsons, Schepis, Reid, McCain, & Green, 1987; Reid & Green, 1990). One study analyzed the separate components of a multi-component intervention. Moore & Fisher (2007) evaluated the effects of providing teachers with differing amounts and types of instructional strategies during implementation of functional analysis procedures. Each functional analysis condition was randomly assigned an instructional strategy (e.g., attention condition and complete video modeling, demand condition and lecture only) and results were reported in a multiple baseline across participants design with embedded multi-element designs. This study found that video modeling with multiple exemplars was more effective than partial video modeling or lecture to train teachers to implement functional analyses. Moore & Fisher's 2007 study offers researchers an experimental methodology for evaluating and comparing common instructional methods used in staff training interventions (e.g., video-modeling, performance feedback, role play).

Participant Characteristics Reported in the Literature

Most studies reviewed here reported some demographic information including the gender and education of staff participants and the age, diagnosis, and target challenging behaviors for target students. The majority (64%) of staff participants worked as teachers or teacher assistants in public or private schools (Codding et al., 2005; Dib & Sturmey, 2007; Durand, 1999; Erbas et al., 2006; Hetzroni & Roth, 2003; Mancina et al., 2000; Seligson Petscher & Bailey, 2006; Wallace et al., 2004; Watson et al., 1999). Other studies included psychology undergraduate students (Iwata et al., 2000) or pre-service teachers as participants (Dib & Sturmey, 2007; Erbas et al., 2006; Seligson Petscher & Bailey, 2006). One study included a school psychologist as participant (Wallace et al., 2004).

Staff gender was reported for 66% of the participants, who were mainly (62%) female. Twenty-seven participants held a bachelor's degree (Codding et al., 2005; Erbas et al., 2006; Moore & Fisher, 2007; Wallace et al., 2004) or were enrolled in coursework leading to an undergraduate degree (Iwata et al., 2000). Nine teachers held a Master's degree (Erbas et al., 2006; Wallace et al., 2004) or were enrolled in coursework leading to a postgraduate degree (Codding et al., 2005; Moore & Fisher, 2007).

Additionally, the majority (91%) of studies utilized researchers as the expert supervisor or instructor during training (Codding et al., 2005; Durand,

1999; Erbas et al., 2006; Hetzroni & Roth, 2003; Iwata et al., 2000; Mancina et al., 2000; Moore & Fisher, 2007; Seligson Petscher & Bailey, 2006; Wallace et al., 2004; Watson et al., 1999).

Regarding student participants, eight articles included students who engaged in challenging behavior as participants (Codding et al., 2005; Dib & Sturmey, 2007; Durand, 1999; Erbas et al., 2006; Hetzroni & Roth, 2003; Mancina et al., 2000; Seligson Petscher & Bailey, 2006; Watson et al., 1999) and three articles utilized actors to play the part of students who engaged in challenging behavior (Iwata et al., 2000; Moore & Fisher, 2007; Wallace et al., 2004). A variety of student behaviors were targeted for assessment and intervention, including crying and screaming, self-injurious behavior (SIB), property destruction, noncompliance, tantrums, and aggression. The average reported age of students was ten years of age, with the majority of students between nine and nineteen years of age. Two students were between three and six years of age. A variety of diagnoses were reported for students including: ASDs (*n*=4 students); moderate intellectual disability (*n*=5 students); severe to profound intellectual disability (*n*=5 students), traumatic brain injury *(n*=5 students), and developmental disability *(n*=5 students). One student was diagnosed with cri-du-chat syndrome and another student was diagnosed with Down syndrome.

Given these results, several comments can be made regarding participant characteristics. First, studies reviewed here primarily focused on training in service special education teachers and teaching assistants, rather than pre service special education teachers. The current professional development model for training special educators involves a combination of classroom instruction and supervised teaching within classrooms. In such models, classroom teachers act as the primary supervisor for student teachers and university supervisors provide intermittent supervision. However, facilitating teachers are sometimes ill prepared to instruct pre service teachers in the implementation of evidence-based assessments and interventions for students with severe disabilities. Therefore, there is often a rift between university training in evidence-based practices and the reality of some classrooms. Additional supervision from university supervisors in "real time" is necessary to assess pre service teacher's generalization of content knowledge to the classroom. Unfortunately, university supervisors must often provide supervision to numerous student teachers across many different schools. The amount of time involved in traveling between schools might limit the frequency and total amount of supervision university supervisors can allocate to each pre-service teacher.

Additionally, the involvement of a wider array of school staff could provide special educators with a supportive network within their own school for

implementing and problem solving assessments and interventions for the treatment of challenging behavior. However, studies reviewed here reported limited involvement of other professional school staff. One study involved a school psychologist and general education teacher (Wallace et al., 2004) and another study trained the school's positive behavior support (PBS) team (Hetzroni & Roth, 2003). Other studies, although not reviewed here, have evaluated interventions for training PBS team members to assess and treat challenging behavior (Chandler, Dahlquist, Repp, & Feltz, 1999; Crone, Hawkin, & Bergstrom, 2007). These studies suggest methods that might be used to scale up the staff training interventions reviewed here from individualized support of teachers to school wide training efforts. The involvement of naturally occurring supervisors (e.g., school psychologists, school behavior specialists) in staff training efforts might contribute to the maintenance of teacher performance, because intermittent feedback and problem solving could be provided by school specialists as teachers needed assistance.

Likewise, a single study reported training a parent in addition to training teaching staff. We know that students with ASDS and intellectual disabilities generally require instruction and intervention across home, school, and community settings for generalized and maintained decreases in challenging behavior and increases in adaptive skills. This requires the involvement of

teachers and other important people in the lives of students including parents and other caregivers (e.g., after school caregivers, grandparents, siblings). With one exception (Durand, 1999), the majority of studies reviewed here did not assess student's challenging behavior in settings outside of the classroom. The generalization of treatment effects to settings outside of the classroom is an important outcome of interventions to decrease challenging behavior and in future studies should be considered a socially valid dependent variable. Of course, decreased challenging behavior across settings requires consistent intervention by the adults typically present in these settings. Therefore, parents and other caregivers will likely need training alongside teachers to better support students who engage in challenging behavior.

Finally, one of the eleven studies reviewed here reported the cultural background of target students or staff participants (Mancina et al., 2000). This almost total absence of cultural and linguistic information for student and staff participants is troubling given that the acceptability of targeted behaviors, instructional strategies, and intervention outcomes might differ for staff, students and their families from culturally and linguistically diverse backgrounds. Some teachers and families may perceive some topographies of challenging behavior as more disruptive to classroom instruction than other behaviors and thus may prioritize assessment and intervention needs differently than another teacher or

family. Given the cultural and linguistic diversity of students who engage in challenging behavior, it is important to consider how the perceptions of teaching staff regarding the challenging behavior of students from backgrounds unlike their own might influence staff behavior towards challenging behavior and the perceived need for assessment and intervention.

Moreover, researchers know little about teacher perceptions regarding the strategies commonly used to train staff to assess and intervene on challenging behavior. Some strategies could be more or less acceptable for individual teachers based on their preferred style of communication and perceptions regarding supervision practices. The extent to which teacher preferences for staff training are influenced or associated with cultural and linguistic background is unknown and should be examined in future research efforts.

Effectiveness of Interventions

The efficacy of a staff training intervention can be judged by the amount of change in staff or target student behavior following intervention, the generalizability of intervention effects to other stimuli or settings, and the long term maintenance of intervention effects (Jahr, 1998). The majority (64%) of studies reviewed here assessed changes to the targeted behavior of teachers and a majority (86%) of the studies reported positive changes in teacher performance following intervention (Codding et al., 2005; Dib & Sturmey, 2007; Erbas et al.,

2006; Iwata et al., 2000; Moore & Fisher, 2007; Seligson Petscher & Bailey, 2006; Wallace et al., 2004). Other studies (45%) reviewed here assessed changes to the targeted behavior of students and reported positive changes in student challenging behavior (100%) (Dib & Sturmey, 2007; Durand, 1999; Hetroni & Roth, 2003; Mancina et al., 2000; Watson et al., 1999). A single study assessed changes to the behaviors of both teachers and targeted students and reported positive changes for each dyad (Dib & Sturmey, 2007). One study reported mixed findings for one of five participants that could be attributed to the learning history of the participant rather than the effectiveness of the intervention (Codding et al., 2005). During baseline assessment, this participant demonstrated higher correct performance of antecedent strategies than the other participants and his performance of antecedent strategies following intervention overlapped with his baseline performance.

A total of four studies reported on the generalization of teacher's skills (Moore & Fisher, 2007; Seligson Petscher & Bailey, 2006; Wallace et al., 2004) or decreased challenging behavior in additional settings, or conditions (Durand, 1999; Mancina et al., 2000). The results of generalization assessment in these studies are generally positive. The majority of these studies (60%) have reported positive findings. For instance, Moore & Fisher (2007) and Wallace et al. (2004) used scripted actors in the first phase of their study and involved actual students

who engaged in challenging behavior in subsequent phases to assess teacher ability to implement functional analyses. Both studies reported that teacher performances at generalization assessment were as good as or better than teacher performance during intervention. However, the findings of approximately 40% of the studies that report generalization indicate that skills may not spontaneously transfer to new tasks without intervention. For instance, when Seligson Petscher and Bailey (2006) assessed the generalization of newly acquired skills to similar tasks, they found that none of the teachers demonstrated spontaneous generalization of skills to these untrained tasks.

Few studies (*n*=3 studies) reported on the long-term maintenance of teacher skills (Codding et al., 2005; Hetzroni & Roth, 2003; Seligson Petscher & Bailey, 2006) or decreases in target student challenging behavior (Hetzroni & Roth, 2003) following withdrawal of the intervention and intervention agent (i.e., supervisor). The majority (80%) of these studies have reported positive findings. For instance, Codding et al (2005) provided performance feedback to teachers learning to implement intervention procedures for 8-22 weeks and reported follow up data indicating the maintenance of skills after the withdrawal of performance feedback. However, the findings of one study suggest that some types of skills may deteriorate without continued intervention. Seligson Petscher & Bailey (2006) were unable to demonstrate maintenance of teacher performance for one

skill (i.e., delivery of bonus points in a token economy) in two of three participants. Since so few studies assessed teacher's generalization or maintenance of newly acquired skills, it is difficult to determine which instructional strategies lead to better generalization and maintenance.

In light of these findings, a couple of points can be made regarding the effectiveness of the interventions reviewed here and their generalizability and maintenance. First, these findings suggest the interventions reviewed here encompass effective strategies for training teachers to assess and treat challenging behaviors. However, as in past reviews of staff training literature, considerable variability exists among studies including the amount of participant improvement, the duration of training, the targeted dependent variables, and the application of independent variables (Jahr, 1998). Without component analysis of intervention packages, it is impossible to draw strong conclusions regarding the effectiveness of interventions.

Second, few studies evaluated the content knowledge of teachers before intervention and no study assessed teachers' content knowledge post-intervention. The accurate implementation of assessment and intervention procedures might rely, in part on teacher understanding of the behavioral principles underlying assessment and intervention procedures to decrease challenging behavior. Increases in content knowledge might be associated with an increased ability to

implement assessment and intervention strategies. Thus, the difference between scores received on pre-and post-intervention assessment scores could provide some evidence of a teacher's ability to implement assessment or interventions with fidelity.

Third, those studies that did report on generalization and maintenance suggest that some teachers will need ongoing support in order to continue implementing some types of interventions at high fidelity. These findings might also suggest that some some types of training strategies are more effective at training teachers in such a way as to improve generalization and maintenance.

Fourth, while the majority of studies evaluated the impact of interventions on the performance of teachers, few studies evaluated the impact of training teachers on a student's challenging behavior. Meaningful student outcomes (e.g., decreased challenging behavior and increased appropriate behavior) are socially important indicators of an effective staff training intervention. There are however some notable exceptions (Dib & Sturmey, 2007; Durand, 1999; Hetzroni & Roth, 2003; Mancina et al., 2000; Watson et al., 1999). With the exception of Dib & Sturmey (2007), these studies have focused on the evaluation of interventions aimed at decreasing the challenging behavior of students, rather than evaluating the effects of a staff training intervention on both teacher and target student outcomes. However, the functional relationship between teacher performance and

student behavior is especially important when training teachers to implement interventions to decrease challenging behavior. Consider that a teacher might learn to implement an intervention to criterion, but their implementation of the intervention with a student might fail to decrease challenging behavior. In such cases, the intervention might need adaptation, or the teacher's performance may indicate a need for further training.

Finally, studies have not attempted to evaluate the effects of staff training interventions on teacher perceptions of challenging behavior. An extensive literature exists regarding the perceptions and experiences of caregivers and teachers of people with intellectual disabilities who engage in challenging behavior (see Hastings, 2005 for a review). Little attention has been paid to interventions evaluating the effects of perceptions of caregivers on intervention effects or the effects of interventions on the perceptions of caregivers (McGill, Bradshaw, & Hughes, 2007). Such perceptions have been conceptualized as setting events for the success or failure of interventions (Allen, 1999). Thus, it would seem necessary to evaluate the effects of staff training interventions on teacher perceptions.

Future Research

This chapter reviewed eleven studies that examined interventions used to train teachers and other school professionals to assess and treat the challenging behavior of students with intellectual disabilities and ASDs. Positive effects were reported for 91% of studies. Due to the small number of studies and the variability of interventions, no definite conclusions can be made regarding the comparative effectiveness of instructional strategies. Despite these limitations, the studies reviewed here suggest effective strategies for training teachers to assess challenging behavior using FBAs and to implement a variety of behavioral interventions to decrease challenging behavior and increase appropriate behavior for students with ASDs and intellectual disabilities. These findings have important implications for teacher preparation programs and for behavior specialists providing training to in service teachers and suggest several possible inquiries for future research.

First, many of the strategies reviewed here involve intensive and individualized feedback to teachers. Little is known about the cost, feasibility and social acceptability of providing intensive feedback to teachers on a larger scale. Schools wishing to train teachers to implement evidence-based assessments and interventions to decrease challenging behavior will likely require guidance to successfully scale up evidence-based staff training strategies such as performance

feedback. Successful scaling up of interventions requires an understanding of the amount of training needed for teachers to learn target behaviors (Walker, 2004) and supervisors may require more efficient strategies for delivering such intensive training.

Schools might wish to reduce the cost of consultation by relying on a combination of antecedent instruction (e.g., lecture, role-play) and consequence interventions (e.g., performance feedback). However, the individual contributions of each of these separate strategies to teacher acquisition and maintenance of targeted skills are unknown. Future research should conduct component analyses of instructional strategies to evaluate the optimal amounts and combinations of independent variables needed to effect measurable staff and student change (Cullen, 1988; Jahr, 1998; Reid & Green, 1990). Further research is required to determine the optimal amounts and combinations of antecedent and consequence strategies to efficiently train teachers to implement FBAs, and develop and implement interventions based on the hypothesized functions of challenging behavior.

Second, schools require instructional strategies for training school staff to move through the entire assessment and intervention process for challenging behavior required by IDEA. That is, teachers should be able to assess challenging behavior using a FBA, develop a hypothesis regarding the social consequences

maintaining the behavior, and implement an intervention based on these results. Recent research suggests that while teachers can accurately identify the cause of challenging behavior, they require training to develop a function-based intervention (Ntinas, Asteriou-Yerofoka, Yiannaros, Koutsouridis, Nanna, & Papadimitriou, 2007). Although this review summarized studies exploring strategies for training teachers to implement functional analyses and a variety of interventions, only one study reported training teachers to both implement a functional analysis and develop a hypothesis regarding the causes of challenging behavior (Erbas et al., 2006). Future research should investigate strategies for assisting teachers to develop a hypothesis based on the results of the functional analysis, and develop a function-based intervention (Johnston & O'Neill, 2001).

Finally, the development of cost and time efficient strategies to deliver evidence-based staff training to teachers is needed. This is an even greater concern for teacher preparation programs implementing distance education programs, or for schools in geographic areas with shortages of behavior specialists. One way that time intensive staff training, such as performance feedback, could be provided to teachers in such situations is through the use of consumer ready videoconferencing equipment

This study evaluates the use of “off the shelf” VTC equipment to deliver immediate performance feedback to teachers learning to implement functional

analyses with children with ASDs who engage in challenging behavior. The results of the proposed study could provide preliminary evidence that current telecommunication technologies can assist university supervisors to provide immediate performance feedback in a cost and time effective manner to teachers.

CHAPTER 3

METHODS

The purpose of this chapter is to introduce the methods used in this study. In the first section, the participant characteristics and setting are described. In the second section, the materials used in this study are discussed in detail. Next, the targeted behaviors of teachers and the procedures for assessing the dependent variable (i.e., correct teacher performance) are introduced. In the fourth section, data collection procedures and the methods for calculating reliability data are presented. Then the procedures for monitoring the fidelity of supervisor implementation of the performance feedback intervention are described. A discussion of the social validity measures follows. Finally, the experimental design and training procedures are described.

Participants

Table 2 reports participants information including teacher's age reported in years, ethnic background as reported by participant, highest degree obtained, and experience working with children with ASDs or intellectual disability reported in years. Six teacher student dyads participated in this study. One participant was a classroom teacher and the remaining five participants were teacher assistants working at a private school for children with developmental delay and ASDs, All

of the teachers were female, and the majority of teachers of Caucasian ethnicity. The average age of participating teachers was 27 years of age (range 22-32 years of age). Each teacher had earned a Bachelor's degree in a field related to special education and Susan had earned a Master's of Special Education degree and was a certified special educator in another state. Three participants were enrolled in a Master's of Special Education program at the time of the study and during the previous semester had completed a course on the assessment and treatment of challenging behavior (i.e., Jessica, Marla, and Christa). Susan reported that her postgraduate degree program lacked coursework in applied behavior analysis or positive behavior supports. None of the teachers had previously implemented an analogue functional analysis.

Each teacher was randomly paired with a student from one of two multi-age classrooms who engaged in challenging behavior. Table 3 reports target student information including age reported in years, ethnic background as reported by family, disability diagnosis, and topographies of challenging behavior. Susan was paired with Dakota, Reagan with Stanley, and Julie worked with Ian. Jessica worked with Carter, and Marla and Christa were paired with Ethan and Henry, respectively. The target students were 6 years of age on average (5-9 years of age). With one exception (Ian), students were Caucasian in ethnicity. With the exception of Dakota, each target student had received a diagnosis of

autism. Dakota's medical files indicated "autistic like tendencies". Target students engaged in a variety of topographies of challenging behavior including crying or screaming, elopement, and aggression.

Setting

All sessions were implemented in a private school serving children with developmental disabilities and ASDs. Sessions were conducted in a classroom with instruction continuing normally for children who did not participate. Between two and five non-participating students were present during the sessions. The sessions were conducted in an area of the classroom with movable screens separating the participants from the other children and teachers present in the classroom.

Table 2. Participant information including teacher's age reported in years, ethnic background as reported by participant, highest degree obtained, and experience working with children with ASDs or intellectual disabilities reported in years.

Participant	Age	Ethnicity	Highest Degree	Experience
Susan	32	Caucasian	Master's Degree in Special Education	6
Reagan	27	Caucasian	Bachelor's Degree in Psychology	4
Julie	23	Caucasian	Bachelor's Degree in Communication Science Disorders	8
*Jessica	29	Caucasian	Bachelor's Degree in Psychology	10
*Marla	27	Caucasian	Bachelor's Degree in Psychology	6
*Christa	22	Chinese/ Polish	Bachelor's Degree in Psychology	4

* Denotes that participant was enrolled in Master's of Special Education program at time of study.

Table 3. Target student information including age reported in years, ethnic background as reported by family, disability diagnosis, and topographies of challenging behavior.

Participant	Age	Ethnicity	Disability Diagnosis	Topographies of Challenging Behavior
Dakota	5	Caucasian	"autistic like tendencies"[a]	aggression consisting of pinching, hitting, and pulling hair; elopement from instructional area; property destruction, noncompliance consisting of putting head down on table and protesting by saying "No" above a conversational level; and screaming.
Stanley	5	Caucasian	autism	stereotypy consisting of hand/arm flapping; crying; and noncompliance consisting of covering his face with his arms or saying, "No".
Ian	6	Asian American	moderate autism	stereotypy consisting of repetitively bouncing hands on the surface of objects and opening and closing his mouth rapidly; and elopement from instructional area.

Table 3. *(continued).*

Participant	Age	Ethnicity	Disability Diagnosis	Topographies of Challenging Behavior
Carter	7	Caucasian	severe autism	self-injurious behavior consisting of hand biting; vocal stereotypy consisting of a high pitched vocal sound; and elopement from instructional area.
Ethan	9	Caucasian	severe autism	aggression consisting of hitting, pushing, kicking, scratching, and hair pulling; crying and screaming; elopement from the instructional area, property destruction; and placing inedible objects in his mouth.
Henry	6	Caucasian	severe autism	self-injurious behavior consisting of hand biting; crying and screaming above a conversational level; stereotypy consisting of rubbing palms of hands on surfaces, and elopement from instructional area.

[a] As indicated by student's medical file.

Materials

Video Tele-conferencing Equipment

VTC was achieved using (a) one 2.0Ghz MacBook™ laptop computer connected to one external iSight™ camera, and (b) one iMac™ desktop computer with a built-in iSight™ camera. The laptop computer used in the classroom was placed on the seat of a child size chair next to the teacher. iChat™ videoconferencing software was used on both computers and iChat™ conference recording software was utilized to capture videoconferencing sessions for data collection purposes. Audio communication was achieved with the microphone and speakers of the laptop computer used by the teacher, while the supervisor used the iMac™ built-in microphone. Both computers were connected to a broadband Internet connection by Ethernet cable or wireless connection. The Internet service was provided by The University of Texas at Austin and the participating private school.

The iSight™ camera has a 640X480-pixel video graphics array (VGA), auto exposure, auto focus, and video capture at 30 frames per second. The iSight™ camera used in the classroom was placed on a plastic standing mount and secured to a stationary object in the classroom so that the supervisor could view

the entire assessment area. Data was transmitted via a wireless local area network (LAN) with Wi-Fi protected network access (WPN) maintained by the private school where the research was conducted to a separate LAN maintained by the university. The confidentiality of data transmission was secured through subscription to an Internet service providing a virtual private network (VPN) with 128-bit encryption.

Target Teacher Behaviors and Measurement

To evaluate the efficacy of training provided via VTC, data was collected on target teacher behaviors. For each functional analysis condition, anticipated teacher responses provided a task analysis of teacher behaviors (adapted from Erbas et al., 2006) (Table 4). These task analyses were used as checklists during baseline, intervention, and maintenance phases of data collection (Appendix B). For example, the delivery of an antecedent teacher behavior (e.g., instructing the child during the demand conditions) was scored as correct if the instruction occurred at the right time or as incorrect if it did not occur. The delivery of consequent teacher behavior (e.g., withdrawal of instructional task when child engages in target challenging behavior) was scored as correct if the withdrawal of task followed a child behavior within 5 seconds or as incorrect if the withdrawal of task did not occur following a child behavior. The non-delivery of consequences (e.g., the absence of teacher attention at the appropriate time during

the attention condition) was scored as correct if it did not occur or as incorrect if it did occur. Each functional analysis condition was five minutes in length.

Data Collection and Interobserver Agreement

The author, a doctoral student in special education with board certification in behavior analysis, served as supervisor during each of the three phases and collected data during each session regarding the occurrence and nonoccurrence of teacher behavior. All sessions were recorded using iChat™ conference recording software and scored by a second observer at a later time for interobserver agreement of teacher performance.

Table 4. Anticipated Teacher Behaviors During Each Functional Analysis Condition.

Attention Condition
1. The teacher directs child towards toys and other items.
2. The teacher tells child what she/he can do (e.g., play with items) while the teacher works.
3. The teacher sits down at place visible to child.
4. The teacher ignores the child if they do not engage in challenging behavior.
5. If the child engages in challenging behavior, the teacher contingently provides attention for 10 seconds.
Play Condition
1. The teacher directs the child towards his/her preferred items.
2. The teacher engages the child in pleasurable activities and delivers attention to the child non-contingently every 10 seconds.
3. If the child engages in challenging behavior, the teacher ignores the behavior.

Table 4. *(continued).*

Demand Condition
1. The teacher directs the child to sit at a table.
2. The teacher provides the child with a clear task direction.
3. If the child does not respond within 5 seconds, the teacher re-states the task direction and uses least to most prompting to promote task completion.
4. If the child engages in challenging behavior, the teacher immediately removes instructional materials from the table and sits with his/her back to the child for 10 seconds.
5. After 10 seconds, the teacher presents the child with another task demand.

The steps of each functional analysis condition were broken down into component tasks using a task analysis procedure (Appendix B). Correct responses were defined as independent completion of a single step of the task analysis. Incorrect responses were defined as failing to complete a step of the task analysis, or inaccurately completing a step. The number of correct teacher behaviors were divided by the number of anticipated teacher behaviors and multiplied by 100 for each functional analysis condition to obtain a percentage of correct teacher responding.

A second observer independently scored data on the target behaviors from the recorded sessions for at least 30% of all sessions during each phase of the study. Data from the two observers were compared for agreements and disagreements. An agreement was scored for a step of the task analysis if both

observers recorded an occurrence or nonoccurrence. Any discrepancy between the observer's scoring resulted in a disagreement for that step of the task analysis. Interobserver agreement on the dependent measure was calculated for each functional analysis condition using the formula:

$$\text{Interobserver Agreement} = \frac{\text{Agreement}}{\text{Agreements + Disagreements}} \text{ X } 100$$

The average IOA for all of the teachers was 97% (range 80-100%). Table 5 reports average and range of IOA across experimental phases for each participant.

Fidelity of Supervisor Implementation of Applied Behavioral Supervision Model

The author's implementation of the supervision model was recorded using iChat™ conference recording software. Treatment fidelity for the intervention phase was assessed by randomly selecting 30% of videotaped sessions for each teacher and having an independent observer score the sessions according to a task analysis of anticipated supervisor behaviors in response to teacher behaviors during functional analysis conditions (Appendix B).

Table 5. Interobserver Agreement for Susan, Reagan, Julie, Jessica, Marla, and Christa Including Reliability Scores for Each Experimental Phase.

Teacher	**Baseline**	**Performance Feedback**	**Maintenance**
Susan	100%	100% (R*=100-100%)	100% (R*=100-100%)
Reagan	100% (R*=100-100%)	100% (R*=100-100%)	95% (R*=80-100%)
Julie	93% (R*=80-100%)	93% (R*=80-100%)	100% (R*=100-100%)
Jessica	100%	97% (R*=80-100%)	100% (R*=100-100%)
Marla	90% (R*=80-100%)	92% (R*=80-100%)	100% (R*=100-100=%)
Christa	100% (R*=100-100%)	90% (R*=80-100%)	100% (R*=100-100%)

R*=Range

Correct responses were defined as independent completion of a single step of the task analysis. Incorrect responses were defined as failing to complete a step of the task analysis, or inaccurately completing a step. The number of supervisor behaviors performed correctly was divided by the number of anticipated supervisor behaviors based on teacher behavior and multiplied by 100 to obtain a percentage of correct supervisor responding.

A second observer independently scored data on the target supervisor behaviors from the recorded sessions for 30% of sessions during the intervention phase. Data from the two observers were compared for agreements and disagreements. An agreement was scored for a step of the task analysis if both observers recorded an occurrence or nonoccurrence. Any discrepancy between the observer's scoring resulted in a disagreement for that step of the task analysis. Interobserver agreement on the fidelity measure was calculated for each functional analysis condition using the formula:

$$\text{Interobserver Agreement} = \frac{\text{Agreements}}{\text{Agreements + Disagreements}} \text{ X } 100$$

The average of correct supervisor implementation of the applied behavior analysis supervision model was 98% (range 75-100%). IOA for treatment fidelity was an average of 98% (range 80-100%). Table 6 reports average and range of treatment fidelity and IOA for each participant.

Table 6. Treatment Fidelity Scores for Supervisor's Delivery of Performance Feedback for Susan, Reagan, Julie, Jessica, Marla, and Christa and Interobserver Agreement.

Teacher	Treatment Fidelity Score During Performance Feedback	Interobserver Agreement
Susan	100% (R*=100-100%)	100% (R*=100-100%)
Reagan	100% (R*=100-100%)	100% (R*=100-100%)
Julie	100% (R*=100-100%)	100% (R*=100-100%)
Jessica	100% (R*=100-100%)	100% (R*=100-100%)
Marla	90% (R*=75-100%)	90% (R*=80-100%)
Christa	100% (R*=100-100%)	100% (R*=100-100%)

R*=Range

Experimental Design

The experimental design was multiple baseline across participants designs with embedded multi-element designs to demonstrate experimental control (Kazdin, 1982). Data collection began for all six teacher student dyads at one

time. Teachers implemented functional analysis conditions in a randomized sequence chosen by the supervisor (e.g., play, demand, attention). During baseline, two teachers performed three functional analysis sessions (one set of functional analysis conditions), two teachers performed six functional analysis sessions (two sets of functional analysis conditions), and two teachers performed nine functional analysis conditions (three sets of functional analysis conditions). The performance feedback intervention was introduced following baseline data collection for each teacher. The intervention continued for each teacher until they had reached a predetermined performance criterion of 100% accuracy for three consecutive sessions in each functional analysis condition. During baseline and intervention phases, sessions were conducted for each teacher for 30 minutes per week. Maintenance observations were used to evaluate the effects of the intervention in the absence of performance feedback.

Training Procedures

Phase I: Baseline Assessment

The teachers were given a peer reviewed journal article describing the procedures of a functional analysis and asked to read it several days before initiating baseline data collection (i.e., methods section of Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). The teachers enrolled in a postgraduate special education program had been assigned this article in a class the previous semester

(i.e., Jessica, Marla, and Christa). Teachers were also provided with a brief note from the author of the current study explaining that while the Iwata et al. (1982/1994) article described the delivery of consequences and inter trial intervals during the functional analysis conditions as thirty seconds in length, the current study would use ten seconds in place of thirty seconds to afford them more opportunities to practice the delivery of consequences within the five minute functional analysis conditions.

One week prior to baseline, the supervisor met with each teacher, indicated which student they would implement functional analysis conditions with, and provided each teacher with a box of unlabeled materials from the child's classroom (i.e., toys and items associated with academic tasks) that the teachers might use during functional analysis conditions. Immediately before the first baseline assessment session, the supervisor met with each teacher via VTC and asked them to choose the target challenging behaviors they would like to assess for their student. The supervisor then assisted teachers to operationally define target behaviors by asking guiding questions via VTC. For example, one teacher said she would like to target self-stimulatory behavior. To further define self-stimulatory behavior, the supervisor asked the teacher to write a description of the self-stimulatory behavior(s) and read her description aloud via VTC. When necessary, the supervisor stated an appropriate operational definition of the target

behavior and encouraged the teacher to define another target behavior. On the first day of baseline assessment, each teacher was given 15 minutes to review the aforementioned written materials and was asked to complete a 20 question quiz assessing their knowledge of functional analysis procedures (Iwata et al., 2000) (Appendix B). Then, the teachers were asked to implement functional analysis sessions (i.e., attention, demand, and play conditions) with their assigned student. The supervisor provided the teacher with prompts via VTC to initiate and end each five-minute functional analysis condition, but no instruction or feedback was provided during baseline assessment.

Phase II: Performance Feedback Provided Via VTC

Teachers implemented functional analysis conditions with structured feedback from the supervisor via VTC equipment. The supervisor provided feedback as prescribed by an applied behavioral supervision model (O'Reilly et al., 1992). Table 7 describes the applied behavioral supervision model in detail. The applied behavioral supervision model consisted of error identification, error correction, and praise. Each time the teacher incorrectly or incompletely implemented a step of the functional analysis condition; the supervisor interrupted the assessment, indicated to the teacher that she had made an error and asked how they might remedy the error. If the teacher verbalized the correct action, the supervisor praised the teacher and told her to proceed with the assessment. If the

teacher verbalized the incorrect answer, the supervisor verbally described the appropriate procedures and prompted the teacher as needed to perform the correct action. Following each functional analysis condition, the supervisor verbally summarized the condition by praising the teacher for correct actions.

During this second phase, teachers were trained to implement three consecutive sessions of each assessment condition (e.g., at least nine sessions total) to 100% accuracy. If a teacher achieved this level of accuracy with some, but not all of the functional analysis conditions, intervention continued only with those conditions that the teacher had not yet achieved 100% accuracy over three consecutive sessions. This phase lasted an average of 75 minutes provided over three weeks (range 60-95 minutes).

Table 7. Description of the applied behavioral analysis supervision model (O'Reilly et al., 1992).

1. If teacher makes an error in implementing procedures, supervisor interrupts assessment, indicates an error, and asks teacher how they might remedy error.
2. If teacher verbalizes correct action, supervisor gives positive feedback and tells teacher to proceed.
3. If teacher verbalizes incorrectly, supervisor describes procedure and models correct action as needed.
4. Supervisor provides praise at end of each implemented condition for procedures performed correctly.

Phase III: Post Intervention Assessment

Functional Analysis Content Quiz

Following the last session of performance feedback, teachers were again provided with the methods section of Iwata et al. (1982/1994) and asked to read it several days prior to completing the same twenty question quiz they had completed prior to baseline assessment (Iwata et al., 2000) (Appendix A). On the day of the post intervention quiz, teachers were given 15 minutes to review the methods section of Iwata et al. (1982/1994).

Social Validity Questionnaires

Following the last session of performance feedback teachers were also asked to complete two social validity questionnaires. One questionnaire consisted of twenty items aimed at assessing the acceptability and feasibility of the intervention (Appendix C). Items on the twenty-item social validity questionnaire related to teacher perceptions regarding general training procedures (3 items), the use of performance feedback (2 items), the outcome of training (5 items), and the use of VTC to deliver performance feedback (4 items). Each item consisted of a single question such as," The delivery of error correction following my incorrect performance was acceptable to me". Teachers were asked to read each statement

and respond by circling the one numerical rating that best fit their agreement with the statement. A 6-point Likert scale provided numerical ratings with “I disagree” indicating a numerical rating of 1 and “I agree” indicating a numerical rating of 6.

A separate questionnaire consisted of 6 open-ended questions aimed at obtaining the written opinions of teachers regarding the use of VTC equipment to deliver performance feedback (Appendix C). Items on the 6 item open-ended questionnaire attempted to target teacher's opinions regarding satisfactory and unsatisfactory intervention procedures and teacher's overall regard for the use of VTC equipment in educational settings. Additional space was provided for comments unrelated to the aforementioned questionnaire items. Teachers were asked to read each statement or question and write their response in the space provided. Teacher responses were anonymous. A number of teacher comments were selected from the open ended questionnaire and reported according based on a maximum variation sampling strategy in order to identify both variation and common patterns of responding (Kuzel, 1992; Patton, 1990). Table 8 in the discussion section reports selected responses from the open-ended questionnaire.

Phase IV: Maintenance Assessment

Maintenance data collection began one to three weeks following each teacher's demonstration of criterion performance and continued at regular weeklong intervals thereafter. During maintenance observations, teachers were

asked to implement several sessions of the functional analysis (e.g., play, demand, escape) with their assigned student without feedback from the supervisor. The supervisor provided the teacher with prompts to initiate and terminate each five-minute functional analysis condition, but did not provide any instruction or feedback. The schedule for maintenance data collection depended on individual teacher schedules. Therefore, the total number of maintenance assessment sessions and the number of weeks between sessions varied across teachers.

For Susan, Reagan, and Christa, maintenance probes were obtained at 1, 3, 4, and 5 weeks following intervention. For Jessica, maintenance probes were obtained at 3, 4, and 5 weeks following intervention. For the remaining teachers, Julie and Marla, maintenance probes were obtained at 1 and 3 weeks following intervention.

CHAPTER 4

RESULTS

This chapter presents study results in several sections. The first section presents baseline and intervention results and discusses the effects of performance feedback delivered via VTC on teacher implementation of functional analysis procedures across conditions (i.e., attention, escape, and play). The second section, maintenance assessment, presents teacher implementation of functional analysis conditions in the absence of supervisor feedback. The final section reports results of the social validity questionnaires regarding teacher perception of performance feedback delivered by VTC.

Teacher Performance on Pre and Post Intervention Functional Analysis Content Quiz

Table 8 reports the pre and post intervention functional analysis content quiz scores for each teacher. Before baseline, the median quiz score obtained by teachers was 70% correct (range 50-85%).

Table 8. Pre and Post Intervention Functional Analysis Content Quiz Scores in Percentage of Correct Responses.

Participant	Pre Intervention Score	Post Intervention Score
Susan	50	65
Reagan	70	80
Julie	70	85
Jessica	60	80
Marla	85	85
Christa	70	90

Teachers frequently missed four pre intervention quiz items related to: (a) functional analysis conditions which serve as experimental controls (i.e., play and alone) (missed by 6 teachers), (b) during the demand condition, the appropriate action if child engages in target challenging behavior following teacher prompt to complete an academic task (i.e., remove instructional materials and turn back to student for 30 seconds) (missed by 5 teachers), and (c) during the escape condition, the appropriate inter trial interval (continuously until child engages in challenging behavior and initiated 30 seconds following target challenging behavior) and the appropriate action when student asks for help completing an academic task (ignore) (each item missed by 4 teachers).

Teachers improved their post intervention quiz score an average of 13 points. The quiz scores of the three teacher assistants enrolled in a postgraduate program of special education improved by a larger margin (median score=85%; range=80-90%) than other teacher's scores (median score=80%; range=65-85%). Post intervention teachers frequently missed items related to: (a) the assessment conditions considered control conditions for the other three conditions (i.e., alone and play) (missed by 6 teachers), (b) inter trial interval during demand condition (i.e., continuously until child engages in challenging behavior) (missed by 6 teachers), and (c) during the demand condition, the correct action to take if the student asks for help (missed by 3 teachers). The supervisor did not address incorrect responses on the post intervention content quiz.

Teacher Implementation of Functional Analysis Conditions

Figures 1 and 2 show teacher performance during baseline, performance feedback intervention, and maintenance phases in percentage of steps completed correctly. Figure 1 shows teacher performance for Susan, Reagan, and Julie. Figure 2 shows teacher performance for Jessica, Marla, and Christa. Each teacher implemented functional analysis conditions with relatively high, yet variable accuracy across baseline sessions (median performance= 63.5%; range=20-100%). Teacher implementation of functional analysis conditions (i.e., attention, escape, and play) improved with performance feedback delivered by VTC

(median performance 100%; range=79-92%). Teachers reached the predetermined performance criteria within 19 sessions (median amount of intervention=75 minutes; range=60-95 minutes).

During baseline, the teachers enrolled in a postgraduate program of special education implemented functional analysis conditions with fewer errors (median performance=63.5%; range=56-69%) than the other teachers (median performance=60%; range=36-56%). Teacher performance across functional analysis conditions varied. Teachers implemented attention (median performance=60%; range=20-80%) and play (median performance=67%; range=33-100%) conditions with fewer errors than demand conditions (median performance=40%; range=20-80%).

Some teachers demonstrated an improved ability to implement one or more functional analysis conditions in baseline. Reagan's implementation of demand conditions improved from 20% to 40% of steps completed correctly. Similarly, Marla's implementation of attention conditions improved from 40% to 60% of steps completed correctly. Christa 's baseline implementation of both demand and play conditions improved from 60% to 80% and 67% to 100% of steps completed correctly, respectively.

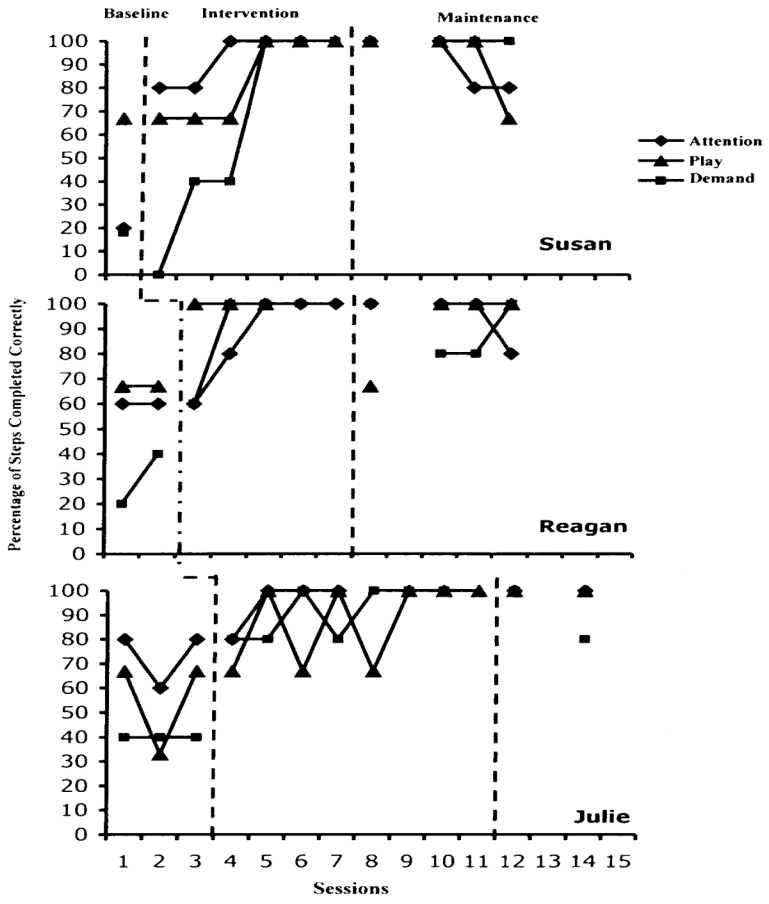

Figure 1. Intervention results for Susan, Reagan, and Julie, including baseline, intervention, and maintenance observations.

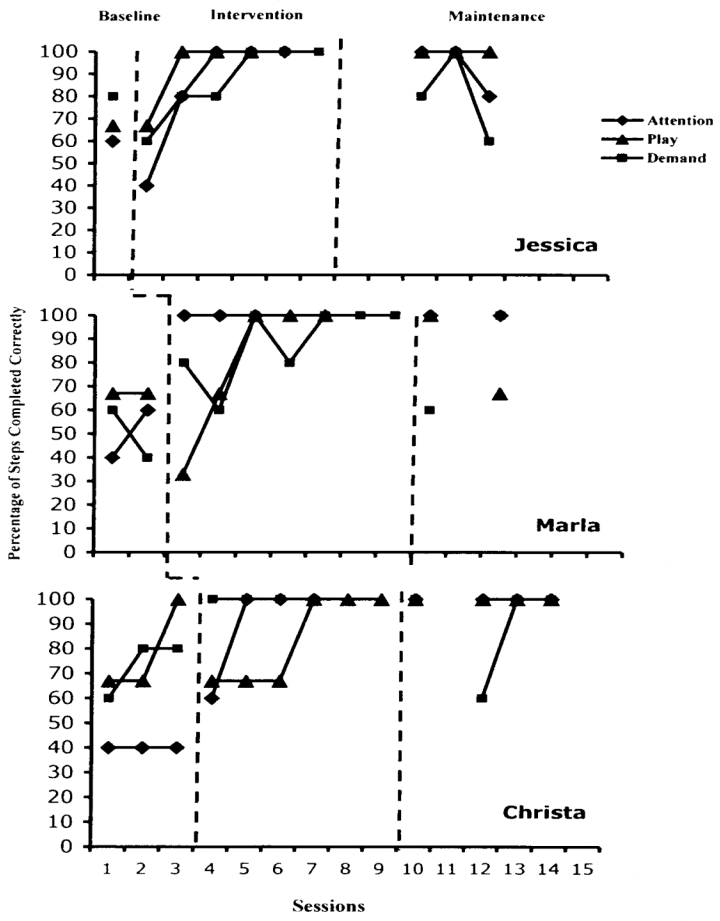

Figure 2. Intervention results for Jessica, Marla, and Christa, including baseline, intervention, and maintenance observations.

During the initial performance feedback session, most teachers demonstrated both an immediate improvement in the implementation of some functional analysis conditions and decline in the implementation of other functional analysis conditions. Susan implemented the baseline attention condition with 20% of steps completed correctly. During the first performance feedback session, Susan implemented the attention condition with 80% accuracy. Reagan also demonstrated immediate improvement implementing demand and play conditions, with high baseline scores of 40% and 67% of steps completed correctly, respectively. Subsequently, she implemented the demand and play condition with 60% and 100% of steps completed correctly responses during the first intervention session. Julie also demonstrated an immediate improvement in her implementation of demand conditions. She implemented baseline demand conditions with 40% of steps completed correctly and subsequently implemented the same condition with 80% accuracy during the initial performance feedback session. Likewise, Marla implemented baseline attention and demand conditions with high scores of 60% of steps completed correctly. During the first performance feedback session, Marla implemented the attention and demand condition with 100% and 80% accuracy, respectively. Christa also demonstrated improved implementation of attention and demand conditions. During baseline, she implemented attention and demand procedures with high scores of 40% and

80% accuracy, respectively. During the initial performance feedback session, she implemented the attention condition with 60% accuracy and the demand condition perfectly.

Some teacher's implementation of one or more functional analysis conditions worsened during the first performance feedback session. Susan implemented a baseline demand condition with 20% accuracy, but failed to correctly implement any steps of the demand condition during the first performance feedback session. During baseline, Jessica implemented attention and demand conditions with 60% and 80% accuracy and subsequently implemented the same conditions with only 40% and 60% accuracy, respectively. Marla's performance of baseline play conditions declined from 67% of steps completed correctly to 33% of steps completed correctly. Christa responded similarly with perfect baseline implementation of the play condition and subsequently implemented the play condition with 67% accuracy.

After the initial performance feedback session, teacher implementation of functional analysis conditions varied. Julie initially implemented the play condition with 67% accuracy. In the next intervention session, Julie implemented the play condition perfectly. Some teacher's performance of functional analysis conditions appeared to plateau for two or more consecutive sessions before showing improvement. Christa implemented play conditions for three consecutive

sessions with 67% accuracy before implementing procedures perfectly in the fourth performance feedback session. Other teachers demonstrated improvement one session, worsened performance in the subsequent session, and again greater accuracy in later sessions. Julie implemented demand and play conditions with 100% accuracy, but her performance of these conditions then worsened for a single session before demonstrating previous accuracy. Likewise, Marla's performance of the demand condition worsened performance during the fourth performance feedback session, but improved during subsequent performance feedback sessions.

Teacher Performance in the Absence of Performance Feedback

Figures 1 and 2 show teacher implementation of functional analysis conditions during maintenance sessions in percentage of steps completed correctly. Figure 1 shows performance data for Susan, Reagan, and Julie. Figure 2 shows performance data Jessica, Marla, and Christa. Maintenance observations were conducted in the absence of performance feedback at one, three, four and five weeks post intervention for Susan, Reagan, and Christa. Maintenance observations occurred at three, four, and five weeks post intervention for Jessica and one and three weeks post intervention for Marla and Julie. Criterion or near criterion levels of performance were maintained for the majority of teachers for

four or more weeks post-intervention (median performance=100%; range=60-100%).

However, teacher implementation of functional analysis conditions varied. Susan's performance maintained at one, three and four weeks post intervention (median performance=100%; range=67-100%). Five weeks post intervention, Susan's implementation of the play condition declined to 67% of steps completed correctly. Although both Reagan and Christa demonstrated below criterion performance of a functional analysis condition during the initial performance feedback sessions, criterion or near criterion performance was maintained for both Reagan (median performance=100%; range=67-100%) and Christa (median performance=100%; range=60-100%) at three, four, and five weeks post intervention. Jessica's performance maintained at three and four weeks post intervention (median performance=100%; range=60-100%). Her performance of the demand condition declined five weeks post intervention to 60% of steps completed correctly. At one-week post intervention, Marla implemented all conditions, but the demand condition (60%) perfectly. At three weeks post intervention, Marla implemented the demand and attention conditions perfectly, but her performance of the play condition worsened. Julie implemented all conditions with 100% accuracy at one-week post intervention and all conditions but demand condition perfectly at three weeks post intervention.

Teacher Perceptions of the Acceptability of the Performance Feedback Intervention

Average ratings across all teachers ranged from 4.6 to 5.7 for each item on the twenty-item social validity questionnaire. Teachers ranked the training procedures, training outcomes, performance feedback, and the use of VTC high with average ratings of 5.6, 5.2, and 5.1, respectively. These results indicate that teachers agreed with questions related to the purpose of the study, the delivery of performance feedback by VTC, and the effects of the intervention on their ability to assess challenging behavior.

Responses to the open-ended social validity questionnaire produced thirty-two total comments that illustrate teacher opinion of VTC to deliver performance feedback. The author categorized the most common and unique responses into the categories of benefits and limitations of VTC. Benefits mentioned by teachers included the acceptability, convenience, and non-intrusiveness of VTC to deliver performance feedback. Limitations mentioned by teachers included the VTC equipment distracting students, and technical difficulties using the VTC equipment. Reliability on the creation of these categories was not obtained. Table 9 presents twenty author selected teacher responses to the open-ended questionnaire arranged by these categories.

Table 9. Selected Responses to Open Ended Social Validity Questionnaire Arranged by Topic Regarding the Benefits and Limitations of Video Tele-conferencing to Deliver Performance Feedback

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I. Benefits of Using Video Tele-conferencing to Deliver Performance Feedback

A. Acceptability of Performance Feedback Delivered via Video Tele-conferencing

The most helpful part was when Wendy watched me and gave suggestions on improvement...especially during the escape condition-which I found the most challenging to learn.

The feedback given from professor immediately after a mistake/or good teaching moment.

Feedback after addressing behavior correctly.

I liked it when she'd tell me right away what I needed to fix, so that I didn't get in a habit.

B. Convenience of Video Tele-conferencing

I could stay on my own computer with kids and didn't need to drive anywhere for a conference or workshop.

It was great to be able to stay on campus in my own environment (familiar) with familiar students.

If I were actually soliciting the help of a consultant, the convenience of using videoconferencing (e.g., not having to pay for driving out there) would be beneficial.

Table 9. ***(continued).***

C. Non-intrusiveness of Video Tele-conferencing

No one needed to be in my classroom that is difficult sometimes in special ed. (When there are already lots of different professionals coming and going).

I get nervous when someone's watching me in person, I really did not feel that same nervousness with the VTC.

Video conferencing was non-invasive and allowed for some schedule flexibility.

I like that there is a person supervising you, but there isn't this added pressure of an additional person in the room. Furthermore, the child is generally unaffected by the web cam.

You can get immediate feedback, but can continue working instead of getting involved in a face to face conversation.

For me, I liked that a person was observing me, yet not in person "breathing down my neck", because I often get flustered when there's a person watching over me making suggestions.

II. Limitations of Using Video Tele-conferencing to Deliver Performance Feedback

A. Distraction to Students

In vivo may have been distracting to the participant.

The equipment being in the way (falling down, being in reach of the student).

Sometimes having the video of her there was more distracting. I had to close the computer so that my student wouldn't keep watching her.

Table 9. ***(continued).***

B. Technical Difficulties
Getting it going. At first there were technical difficulties. But benefits out weigh this drawback.
When the computer would break down.
I dislike the random computer glitches that occur when children or adults mess with the computer.

CHAPTER 5

DISCUSSION AND CONCLUDING COMMENTS

This study evaluated the effects of performance feedback when delivered by VTC on teacher implementation of functional analysis conditions. In the first phase of this study, teachers demonstrated their understanding of functional analysis procedures by completing a pre intervention content quiz and implementing functional analysis conditions with a child who engaged in challenging behavior. VTC equipment facilitated data collection on teachers' performance of functional analysis conditions. Teacher implementation of functional analysis conditions was reported in Figures 1 and 2 as percentage of steps completed correctly. The twenty item pre intervention content quiz assessed teacher understanding of functional analysis theory and conditions (i.e., alone, attention, demand, and play) (Appendix B). Results of the pre intervention quiz suggested limited knowledge of functional analysis procedures and underlying theory. During baseline, teacher implementation of functional analysis conditions demonstrated a basic grasp of functional analysis procedures. Some teachers' implementation of one or more functional analysis conditions improved during baseline. However, each teacher also implemented other functional analysis conditions incorrectly. These results suggest that teachers require training to implement functional analysis conditions with integrity.

In the second phase, immediate performance feedback was delivered to teachers implementing functional analysis conditions by VTC. Results of the intervention phase indicated that teachers' implementation of functional analysis conditions quickly improved following immediate performance feedback provided by VTC. Post intervention functional analysis content quiz scores demonstrated similar improvements in teacher understanding of functional analysis procedures. Additionally, teacher responses to the social validity questionnaires indicated that teachers accepted and were satisfied with the purposes, procedures and outcomes of the performance feedback intervention when delivered by VTC.

In the last phase, maintenance observations provided information regarding teachers' short-term maintenance of functional analysis procedures in the absence of performance feedback. During maintenance observations, teachers demonstrated satisfactory, but variable implementation of functional analysis conditions. Criterion or near criterion performance was maintained by four of the six teachers at four weeks post intervention.

The findings of this study extend the current staff training literature in several meaningful ways. First, the results of this study have important practical implications for teacher preparation programs. This study contributes to a growing body of research supporting the use of VTC to conduct educational

assessments in special education settings by demonstrating that teachers can be trained to assess challenging behavior when performance feedback is provided by VTC (Machalicek et al., in press a; Machalicek et al., in press b). Using relatively inexpensive videoconferencing equipment (computers equipped with web cameras and broadband Internet connection), the university supervisor provided immediate feedback in real time to teachers and collected reliable teacher performance data from an off campus office during functional analysis sessions. Teachers quickly learned to implement functional analysis conditions in special education classrooms when performance feedback was provided via VTC. These are important findings given the effects of serious challenging behavior on children and youth with ASDs and their teachers (National Research Council, 2001) and educational legislation requiring appropriate assessment and treatment of challenging behavior (IDEA, 1990; IDEA Amendments, 1997; IDEA Improvement Act, 2004). Additionally, IDEA 2004 requires schools to make trained school staff available to conduct FBAs, develop and modify BIPs.

Therefore, the assessment and treatment of challenging behavior is a core component of teacher preparation programs. Performance feedback procedures are among the most commonly used evidence-based strategies in staff training (Alvero et al., 2001). However, teacher preparation programs might experience difficulty in implementing such intensive instruction, because fieldwork sites can

be dispersed over wide geographic areas and necessitate potentially costly travel between schools for the university supervisor. The amount of time spent traveling between student placements can necessarily limit the frequency of supervision for individual students. Therefore, the amount of face-to-face supervision provided to pre service teachers might be insufficient for some teachers to learn evidence-based assessment and intervention procedures. Unfortunately, the cost of providing face-to-face supervision might prevent some teacher preparation programs from carefully pairing supervision with concepts and procedures covered in coursework.

Nevertheless, immediate performance feedback following classroom instruction might be necessary for pre service teachers to acquire and fluently implement evidence-based assessment and intervention strategies. In this study, three teachers were enrolled in a postgraduate special education program and had successfully completed coursework in challenging behavior that included in depth reading and discussion of functional analysis procedures. Despite this previous coursework, teachers were unable to independently implement functional analysis conditions during baseline. Based on the results of this study, pre service teachers might require instruction and feedback in addition to coursework to implement evidence-based assessment and intervention procedures with fidelity.

This study illustrated the use of VTC equipment to facilitate such intensive feedback. Consumer ready VTC equipment allowed a university-based supervisor to deliver a time intensive staff training intervention to teachers while they remained in their own classrooms. The use of "off the shelf" videoconferencing equipment might provide teacher preparation programs a way to easily supplement the face-to-face supervision of pre service teachers in their fieldwork sites using equipment that is commonly available to both university supervisors and pre service teachers (i.e., laptop computer, web camera, Internet). Additionally, the discrete skills learned by the teachers' in this study are similar to the skills required to implement other assessments, BIPs and instructional interventions. For instance, an analogue functional analysis requires the implementer to quickly assess whether student behavior is a target behavior, and deliver antecedents and consequences accordingly. These are the same skills required to effectively implement a BIP with antecedent and consequence procedures. If teachers require additional instruction and feedback to accurately implement functional analysis procedures, they might also benefit from additional instruction and feedback to implement other educational assessments (e.g., preference assessment) and intervention procedures (e.g., time delay). Although this study only assessed teachers' acquisition of functional analysis conditions, VTC might also be used to deliver instruction and supervision to teachers learning

to implement other types of assessments and interventions. Future research should evaluate the uses and cost and benefits of using VTC to deliver instruction and supervision to a larger number of teachers so that teacher preparation programs can weigh the relative benefits and limitations of using VTC when compared to in person training and supervision.

Furthermore, teachers rated performance feedback delivered by VTC as beneficial and acceptable. Responses to the social validity questionnaires indicated that teachers liked receiving performance feedback from a distance and found the delivery of praise and error correction acceptable. These are interesting findings given that researchers have suggested that performance feedback may serve as a negatively reinforcing consequence for some teachers and thus have recommended researchers to assess the social validity of performance feedback (Mortenson & Witt, 1998). Teachers also appeared to find the delivery of performance feedback by VTC convenient, because they were able to stay in their own classrooms during training. Teachers also described the intervention as less intrusive than face-to-face supervision. Of particular interest are the comments of several teachers (n=3) describing diminished performance anxiety when receiving feedback from a supervisor who was not present in the same room. The results of this study provide some preliminary evidence that teachers are comfortable with the consequences of performance feedback when provided by VTC. However, the

social validity questionnaires used in this study were not standardized and might not have reliably assessed teacher perceptions of the intervention. Nonetheless, the comments provided by teachers in response to the open ended social validity questionnaire points to the need to develop a standardized social validity questionnaire for use in staff training research.

A number of standardized social validity questionnaires are commonly used to give parents and teachers the opportunity to evaluate the acceptability of interventions for children (see Carter, 2007 for a review). Unfortunately, a similar standardized questionnaire to provide teachers with the opportunity to assess the social validity of staff training is not currently available. Future research should evaluate the reliability and validity of common types of social validity questionnaires already used to assess the social validity of staff training interventions (i.e., Likert rating scales). In clinical psychology, some factors considered important when assessing consumer satisfaction with treatments have included consumer satisfaction or dissatisfaction with the amount of change in targeted goals, the treatment procedures, and the therapist (Foster & Mash, 1999). Accordingly, social validity questionnaires developed for use in teacher training should include items aimed at evaluating teacher's satisfaction with the degree of their own behavioral change resulting from the staff training, the training procedures, and the supervisor(s) delivering the training.

Additionally, pre baseline content quizzes are typically administered to demonstrate the amount of knowledge each teacher brings into baseline and show similarity among participant knowledge. In this study, the results of the pre intervention content quiz and subsequent baseline performance of functional analysis conditions suggest a potentially complicated relationship between a teacher's knowledge and understanding of assessment procedures and their subsequent ability to accurately implement assessment procedures. During baseline, four teachers (i.e., Susan, Reagan, Julie, and Marla) incorrectly answered quiz items related to the demand condition and subsequently made mistakes while implementing demand conditions. However, missing a quiz item related to the demand condition was not entirely correlated with its subsequent implementation. Jessica missed three quiz items related to implementation of the demand condition and subsequently implemented demand procedures with good accuracy. Likewise, Christa missed two quiz items related to implementation of the demand condition and subsequently implemented demand procedures with fair to good accuracy. Similarly, teachers demonstrated mixed results during other functional analysis conditions (i.e., attention and play). Susan implemented an attention condition with poor accuracy during baseline assessment and also missed several related quiz items. Marla also experienced difficulty implementing attention and play conditions during baseline, but did not miss related quiz items.

Reagan made mistakes implementing play conditions, but correctly answered related quiz items. The results of the current study suggest that pre intervention content scores can only partly account for a teacher's subsequent performance of functional analysis conditions.

Previous studies have used of the same quiz adapted for use in this study as an indicator of participant readiness to implement functional analysis procedures (Erbas et al., 2006; Iwata et al., 2000; Moore & Fisher, 2007). Participants in these investigations took the functional analysis content quiz, reviewed their answers with researchers, and then took the quiz a second time if they answered fewer than 90% of questions correctly. While a score of 90% correct might positively predict actual future performance, the pre intervention scores obtained by teachers in this study were not adequate to predict their subsequent implementation of functional analysis conditions. The delivery of consequences following unpredictable child behavior might reasonably require a different set of skills than recalling assessment procedures in response to written questions. Teachers might correctly answer quiz questions regarding functional analysis conditions yet lack the necessary fluency to respond quickly and accurately during actual assessment conditions. Future research should attempt to better define the relationship between teacher's content knowledge of assessment and intervention procedures and their subsequent performance. If such a

relationship is discovered, the amount of training required by teachers to master assessment and intervention procedures could be tailored to a teacher's unique learning needs. Training efforts could then focus on practicing skills related to incorrect answers.

The current study has several limitations. First, some teacher's performance of functional analysis conditions across experimental phases demonstrates data trends that could be explained by variables other than the introduction of the performance feedback intervention. During baseline, teacher's implementation of functional analysis conditions was relatively high and variable across conditions and sessions. These results are similar to the results of previous research evaluating strategies to train psychology students to implement functional analyses (Iwata et al., 2000). As in Iwata et al. (2000), the teachers in this study entered baseline assessment having read the methods section of Iwata et al. (1982/1994). The teachers had also likely gained some understanding of functional analysis procedures from their education in special education and classroom experiences. Although short baselines were planned to limit practice effects these results indicate that small amounts of practice over several weeks could lead to improved implementation of certain functional analysis conditions for some teachers. Reagan, Marla, and Christa's implementation of one or more functional analysis conditions improved during baseline. Indeed, Christa's

continued improvement of play conditions during baseline to 100% accuracy suggests that practice of functional analysis conditions alone might improve performance for some teachers. Continuing baseline assessment until data trends stabilized for each teacher would have strengthened the current results. This solution was unsatisfactory due to the additional time commitment that would have been required by teachers and lost instructional time for students. Nor would it have been satisfactory or socially valid for teachers to enter baseline assessment with no knowledge of functional analysis procedures. Teachers in this study regularly taught children who engaged in challenging behavior and so were required to understand something of the consequences maintaining challenging behavior in order to correctly implement a behavioral intervention plan (BIP). Nonetheless, the improved performance of teachers during baseline weakens the experimental control of the current study.

Moreover, during the first performance feedback session, the majority of teachers demonstrated an immediate improvement in their implementation of one or more functional analysis conditions. For Reagan, Marla, and Christa, these results might be explained as a continuation of their upward baseline data trends. These results suggest that some teacher teacher's implementation of functional analysis conditions improved as the result of a variable other than the introduction of performance feedback. This increased performance might also be interpreted as

teacher awareness of performance expectations and anticipation of planned consequences during the performance feedback phase. Just before the first performance feedback session, the supervisor explained performance feedback procedures in detail to teachers. In this study, correct responses were followed by supervisor praise and incorrect or incomplete responses were followed by corrective feedback and modeling as needed. For some teachers, a statement of praise might function to reinforce preceding behavior. Thus, if teachers are aware of the availability of praise, as they were during the first initial performance feedback session, they might have increased their focus on correctly implementing functional analysis procedures so as to obtain praise. Some researchers have explained the effects of performance feedback as negative reinforcement (Mortenson & Witt, 1998). For some teachers, corrective feedback following teacher error might function to punish preceding behavior. Thus, if teachers anticipate corrective feedback when they make an error, as they did during the initial performance feedback phase, they might have increased their focus on correctly implementing functional analysis procedures to avoid receiving corrective feedback. An evaluation of the effects of the separate social consequences (i.e., praise and error correction) provided during performance feedback interventions on teacher behavior might provide researchers with information about the functional relationships between common staff training

strategies and teacher behavior. For example, a single-subject alternating treatment design would allow researchers to evaluate the differential effects of praise and corrective feedback on teacher acquisition of novel intervention procedures (e.g., delivery of attention to a child following 1 minute of task engagement paired with praise only; delivery of antecedent cue to a child at beginning of academic task paired with corrective feedback only). Further research should develop such methodologies to assess the functional relationship between teacher behavior and social consequences.

A second limitation is the limited maintenance of teacher performance in the absence of performance feedback. Although four of the six teachers demonstrated criterion or near criterion performance at four weeks post intervention, many teacher's ability to correctly implement functional analysis sessions varied across observations or declined over time. These results might be explained by natural variations in teacher attention to the task at hand, by the time limited effects of the intervention, or by waxing and waning of teacher motivation. Future research should assess the maintenance of teacher performance over longer periods to determine if the variability demonstrated in this study could be explained by natural variations in teacher behavior or as a time limited effect of the performance feedback intervention. Evidence for the time limited effects of the performance feedback intervention would be provided if teacher performance

steadily declines during continued maintenance observations. If teacher performance continues to vary between criterion and below criterion performance, natural variations in teacher attention or motivation could better explain the results of this study.

However, the results of this study might also be explained by teacher awareness of the absence of social consequences during the maintenance condition. Just before the first maintenance session, the supervisor explained that the teacher would implement functional analysis conditions as they had during the performance feedback phase, but no praise or corrective feedback would be provided. In this study, teachers may have been less motivated to correctly implement functional analysis conditions in the absence of the social consequences provided by performance feedback. Future research should evaluate the availability and absence of social consequences as potential motivational variables influencing teacher's acquisition and maintenance of assessment and intervention strategies. However, researchers must first develop functional assessment methodologies to identify a potential reinforcer and punisher of teacher behavior (Olson et al., 2001).

Third, this study was limited in scope to evaluating the effects of performance feedback by VTC on teacher acquisition and short-term maintenance of functional analysis procedures with a single child. Generalization of teacher

performance to another child was not assessed and teachers were not trained to implement other procedures associated with evidence-based assessment and treatment of challenging behavior (e.g., developing a hypothesis statement and intervention based on results of functional analysis). Teachers were paired with a child who engaged in a range of behavioral topographies with varying social consequences maintaining their challenging behavior. Thus, some teachers were exposed to different topographies of challenging behavior and more frequent challenging behaviors during one or more functional analysis conditions. The participation of children who engage in challenging behavior may contribute to the generalization of teacher skills to other children. However, if teachers learn to implement functional analysis conditions with a single child, they will likely experience differential opportunities across functional analysis conditions to deliver consequences. For instance, if teachers are paired with a student who primarily engages in challenging behavior to escape academic demands, they may have fewer opportunities to implement consequence procedures during attention conditions. Teachers could then experience difficulty implementing a functional analysis with a child who engages in different topographies of challenging behavior for different functions (e.g., to obtain attention). To better prepare teachers for the range of challenging behaviors they are likely to encounter in their careers, supervisors may need to train teachers to implement functional

analysis conditions with several students, or through the additional use of case studies and role play. Future research should evaluate the ability of teachers to generalize recently acquired functional analysis skills to students with dissimilar repertoires of behavior.

Additionally, this study did not train teachers to implement the variety of skills needed to effectively assess and develop interventions for the challenging behavior of students with severe disabilities. Teachers must be able to individualize functional analysis sessions when initial results are inconclusive (e.g., the addition of an alone or tangible condition), interpret available data to develop a hypothesis statement, and design, implement and evaluate an appropriate function based intervention. Past research has shown that, while teachers can accurately identify the causes of challenging behavior, teachers have difficulty designing an appropriate intervention matched to the function of the challenging behavior (Johnston & O'Neill, 2001; Ntinas et al., 2007). Many studies have suggested more staff training research evaluating strategies to train teachers to implement more complex assessment procedures involving a teacher's clinical judgment (e.g., changing the difficulty of the task presented during demand conditions) (Erbas et al., 2006; Iwata et al., 2000; Moore & Fisher, 2007; Wallace et al., 2004). Researchers have proposed different models for guiding teachers through the often complicated process of developing a hypothesis about

the causes of challenging behavior, and developing an appropriate intervention to decrease challenging behaviors and increase appropriate behaviors (O'Neill, Horner, Albin, Sprague, Storey, & Newton, 1997; Scott & Nelson, 1999). Researchers have also evaluated an intervention selection model that has teachers implement a number of intervention procedures with consultant support and then asks the teacher to provide input on intervention selection (Mueller, Edwards, & Trahant, 2003). Such an intervention selection model might be used to train teachers via VTC to implement a variety of intervention procedures aimed at decreasing challenging behavior and assess a teacher's ability to chose an intervention based on the hypothesized function of the student's challenging behavior. Future research should evaluate the use of performance feedback and other instructional strategies on teacher acquisition and maintenance of such complicated assessment and intervention skills.

Finally, although teachers rated the use of VTC to deliver performance feedback positively and described several benefits to using VTC, several teachers mentioned technical difficulties as limitations to the use of VTC. Throughout the study, each teacher experienced one to two sessions with technical issues. Technical difficulties arose when teachers or children had inadvertently changed the settings of the computer (e.g., accidentally pressing the mute button) or when the child's challenging behavior affected the VTC equipment (e.g., child throws a

puzzle piece that hits the web camera). The intrusiveness of VTC equipment may rely in part on the characteristics of the target child. During sessions with children who exhibited more frequent or intense challenging behavior, teachers experienced more frequent technical difficulties. For instance, one child screamed loudly during demand conditions and temporarily precluded communication between the supervisor and teacher. Another teacher mentioned that the VTC equipment might be a distraction for some students. Indeed, each of the six children displayed varying levels of interest in the VTC equipment. Children were easily re-directed, but a couple of children displayed more persistent distraction. For instance, one child pulled a key cover from the laptop computer's keyboard during the attention condition.

From the supervisor's perspective, these difficulties were easily prevented or remedied within five minutes by asking the teacher to readjust or move the equipment (i.e., placing the web camera on a window ledge above the assessment area and moving the laptop computer beneath the table out of the child's sight). Of course, these difficulties interrupted teacher implementation of the functional analysis and the remedies proved more difficult for teachers assessing children who engaged in elopement from the assessment area. Technical difficulties might have been prevented by training all of the teachers at the onset of the study in the use of VTC equipment and software. A couple of teachers familiar with

videoconferencing equipment and software volunteered to set up and take down the VTC equipment. However, most teachers were only responsible for inviting or accepting a videoconference session, which required a single step. Ultimately the social validity of VTC in educational settings relies on the ability of participating teachers to set up necessary equipment and problems solve technical difficulties. Future research should evaluate the social validity of VTC facilitated training after teachers have been orientated to the uses of the equipment. Additionally, these limitations should be weighed against the benefits of using VTC in staff training. Whenever both in person and VTC facilitated supervision are available, supervisors might first explain the benefits and limitations for each delivery method and then allow teachers to choose their preferred method. For some situations, face-to-face supervision could be easier for both the supervisor and the teacher (e.g., when target children engage in challenging behavior at a volume that precludes effective communication). One might assume that teachers working in educational settings with specialist shortages might perceive the inconveniences and benefits of VTC uniquely given the high demand for specialist support and the prohibitive cost of travel to obtain special training. Future research should continue to evaluate variables affecting the point at which the benefits of using VTC in educational settings outweigh the limitations for teachers.

In summary, consumer ready VTC equipment may provide researchers and clinicians an effective method to deliver support and training to teachers working in geographically remote areas or in areas with specialist shortages. The results of this study suggest that immediate performance feedback when delivered by consumer ready VTC equipment (i.e., laptop computer, web camera, broadband Internet) is an effective and acceptable method for training pre and in service teachers to implement functional analyses with children with ASDs who engage in challenging behavior. Following performance feedback sessions, teacher's implementation of functional analysis conditions quickly improved and each teacher reached the predetermined performance criterion within a short amount of training. These results were maintained for four of the six teachers at four weeks post intervention. Furthermore, teacher responses to the social validity questionnaires indicated that teachers were generally pleased with performance feedback when delivered by VTC and perceived the outcomes of their training as helpful in their work with children who engage in challenging behavior.

APPENDIX A

Functional Analysis Content Quiz

(adapted from Iwata et al., 2000)

Teacher's Name:_____

1. Which assessment condition (attention, demand, play, alone) is considered the control condition for the other three conditions?

2. In which assessment condition or conditions does the student have access to leisure items?

3. During all conditions, what should you do if the student engages in disruptive or aggressive behavior that is not a target behavior during the functional analysis?

4. What should you do if a student becomes injured during a session?

5. How do you begin an attention session (what do you say and do?)?

6. When do you deliver attention to the student during the attention condition?

7. Give two examples of what you might say or do when delivering attention during the attention condition.

8. What should you do if the student asks a question or requests help during the attention condition?

9. How often do you deliver attention to the student during the play condition?

10. Give two examples of what you might say or do when delivering attention during the play condition.

11. What should you do if the student engages in the target behavior(s) during the play condition just as you are about to deliver attention?

12. What should you do if the student asks you a question during the play condition when you are not scheduled to deliver attention?

13. What should you do if the student engages in disruptive behavior that is not a target behavior during the play condition?

14. How often should you initiate training trials during the demand condition?

15. If the task during the demand condition is putting a puzzle piece into a puzzle, what should you say when initiating a trial?

16. If, during the demand condition, the student does not respond to your first prompt within 5 s, what should you do?

17. If, during the demand condition, the student does not respond to your second prompt within 5 s, what should you do?

18. What should you do if the student engages in the target behavior(s) while you are trying to get the student to work on a puzzle during the demand condition?

19. Should you praise the student during the demand condition if you had to physically guide the student to complete the task?

20. What should you do if the student asks for help completing the assigned task during the demand condition?

APPENDIX B

Checklist of Anticipated Teacher Behaviors During Functional Analysis Conditions

Attention Condition

TEACHER BEHAVIORS	CORRECT	INCORRECT
Directs child towards toys.		
Tells child what she/he can do while teacher works.		
Teacher sits down at place visible to child.		
Teacher ignores child if they do not engage in challenging behavior.		
If child engages in challenging behavior, teacher contingently provides attention for 10 seconds.		

Demand Condition

TEACHER BEHAVIORS	CORRECT	INCORRECT
Directs child to sit at table.		
Provides child with a clear task direction.		
If the child does not respond within 5 seconds, teacher re-states task direction and uses least to most prompting to promote task completion.		
If child engages in challenging behavior, teacher immediately removes instructional materials from table and sits w/his or her back to the child for 10 seconds.		
After 10 seconds, the teacher presents the child with another task demand.		

Play Condition

TEACHER BEHAVIORS	CORRECT	INCORRECT
Directs child towards toys.		
Teacher engages child in pleasurable activities and delivers attention to child non-contingently every 10 seconds.		
If the child engages in challenging behavior, the teacher ignores the behavior.		

Treatment Fidelity Checklist for Applied Behavioral Analysis Supervision Model

Attention, Demand, and Play conditions

SUPERVISOR BEHAVIORS	CORRECT	INCORRECT
If teacher makes an error in implementing procedures, supervisor interrupts assessment, indicates an error, and asks teacher how they might remedy error.		
If teacher verbalizes correct action, supervisor gives positive feedback and tells teacher to proceed.		
If teacher verbalizes incorrectly, supervisor describes procedure and models correct action as needed.		
Supervisor provides praise at end of each implemented condition for procedures performed correctly.		

APPENDIX C

Performance Feedback Acceptability and Feasibility Rating

Instructions: After reading each of the following statements, indicate a numerical rating that best describes your agreement with the statement. There are no right or wrong answers.

1. Implementing functional analysis conditions with supervision provided via video tele-conferencing was not too difficult.

1----------2----------3----------4----------5----------6
I disagree I agree

2. This training has helped clarify how to implement analog functional analysis conditions with students who engage in challenging behavior.

1----------2----------3----------4----------5----------6
I disagree I agree

3. I would recommend video tele-conferencing training to other teachers.

1----------2----------3----------4----------5----------6
I disagree I agree

4. The video-conferencing training was practical.

1----------2----------3----------4----------5----------6
I disagree I agree

5. The training I received has strengthened my skills in assessing challenging behavior.

1----------2----------3----------4----------5----------6
I disagree I agree

6. The delivery of praise following my correct performance was acceptable to me.

1----------2----------3----------4----------5----------6
I disagree I agree

7. The delivery of error correction following my incorrect performance was acceptable to me.

1----------2----------3----------4----------5----------6
I disagree I agree

8. My students will benefit from my training.

1----------2----------3----------4----------5----------6
I disagree I agree

9. I think behavioral supervision delivered via video tele-conferencing is an appropriate way to teach functional analysis procedures.

1----------2----------3----------4----------5----------6
I disagree I agree

10. This training would be helpful in training teachers to implement other educational assessments or interventions.

1----------2----------3----------4----------5----------6
I disagree I agree

11. I feel confident in my ability to implement functional analysis conditions with my students.

1----------2----------3----------4----------5----------6
I disagree I agree

12. Other teachers in my school should be trained to implement functional analysis.

1----------2----------3----------4----------5----------6
I disagree I agree

13. The technical aspects of video tele-conferencing were effective (e.g., clear picture and sound, speed of transmission).

1----------2----------3----------4----------5----------6
I disagree I agree

14. Setting up the video tele-conferencing for training sessions was feasible.

1----------2----------3----------4----------5----------6
I disagree I agree

Open Ended Questions Regarding the Acceptability and Feasibility of Video Tele-conferencing

Instructions: After reading each of the following questions, please provide your response. There are no right or wrong answers.

1. What was the most helpful part of the training?

2. What was the least helpful part of the training?

3. What did you like about using video tele-conferencing?

4. What did you dislike about using video tele-conferencing?

5. What were the benefits of using video tele-conferencing?

6. How did learning new information via video tele-conferencing compare to face-to-face instruction?

Additional Comments:

REFERENCES

Agnew, J. (1998). The establishing operation in organizational behavior management. *Journal of Organizational Behavior Management*, *18*, 7-19.

Allen, D. (1999). Mediator analysis: An overview of recent research on carers supporting people with intellectual disabilities and challenging behaviour. *Journal of Intellectual Disability Research*, *43*, 325-339.

Alvero, A., Bucklin, B., & Austin, J. (2001). An objective review of the effectiveness and essential characteristics of performance feedback in organizational settings (1985-1998). *Journal of Organizational Behavior Management*, *21*, 3-29.

Applegate, H., Matson, J., & Cherry, K. (1999). An evaluation of functional variables affecting severe problem behaviors in adults with mental retardation by using the questions about behavioral function scale (QABF). *Research in Developmental Disabilities*, *20*, 229-237.

Ayres, B., Meyer, L., Erevelles, N., & Park-Lee, S. (1994). Easy for you to say: Teacher perspectives on implementing most promising practices. *Journal of the Association for Persons with Severe Handicaps*, *19*, 84-93.

Baghdadli, A., Pascal, C., Grisli, S., & Aussiloux, C. (2003). Risk factors for self-injurious behaviours among 222 young children with autistic disorders. *Journal of Intellectual Disabilities Research*, *47*, 622-627.

Barretto, A., Wacker, D., Harding, J., Lee, J., & Berg, W. (2006). Using telemedicine to conduct behavioral assessments. *Journal of Applied Behavior Assessment*, *39*, 333-340.

Berryman, J., Evans, I., & Kalbag, A. (1994). The effects of training in

nonaversive behavior management on the attitudes and understanding of direct care staff. *Journal of Behavior Therapy and Experimental Psychiatry*, *25*, 241-250.

Brownell, M., Ross, D., Colón, E., & McCallum, C. (2005). Critical features of special education teacher preparation: A comparison with general teacher education. *The Journal of Special Education*, *38*(4), 242-252.

Campbell, P, & Hallbert, J. (2002). Between research and practice: Provider perspectives on early intervention. *Topics in Early Childhood Special Education*, 22, 213-223.

Carr, E., Taylor, J., & Robinson, S. (1991). The effects of severe behavior problems in children on the teaching behavior of adults. *Journal of Applied Behavior Analysis*, *24*, 525-535.

Carter, S. (2007). Review of recent treatment acceptability research. *Education and Training in Developmental Disabilities*, *42*, 301-316.

Chandler, L., Dahlquist, C., Repp, A., & Feltz, C. (1999). The effects of team-based functional analysis on the behavior of students in classroom settings. *Exceptional Children*, *66*, 101-122.

Codding, R., Feinberg, A., Dunn, E., & Pace, G. (2005). Effects of immediate performance feedback on implementation of behavior support plans. *Journal of Applied Behavior Analysis*, *38*, 205-219.

Conroy, M., Dunlap, G., Clarke, S., & Alter, P. (2005). A descriptive analysis of positive behavioral intervention research with young children with challenging behavior. *TECSE*, *25*, 157-166.

Crone, D., Hawkin, L., Bergstrom, M. (2007). A demonstration of training, implementing, and using functional behavioral assessment in 10

elementary and middle school settings. *Journal of Positive Behavior Interventions*, *9*, 15-29.

Cullen, C. (1988). A review of staff training: The emperor's old clothes. *The Irish Journal of Psychology*, *9*, 309-323.

Demchak, M. (1987). A review of behavioral staff training in special education settings. *Education and Training in Mental Retardation*, *22*, 205-217.

Dib, N., & Sturmey, P. (2007). Reducing student stereotypy by improving teachers' implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis*, *40*, 339-343.

Didden, R., Duker, R., & Korzilius, H. (1997). Meta-analytic study on treatment effectiveness for problem behaviours with individuals who have mental retardation. *American Journal of Mental Retardation*, *101*, 387-399.

Durand, M. (1999). Functional communication training using assistive devices: Recruiting natural communities of reinforcement. *Journal of Applied Behavior Analysis*, *3*, 247-267.

Emerson, E., Kiernan, C., Alborz, A., Reeves, D., Mason, H., Swarbrick, R., et al. (2001). The prevalence of challenging behaviors: A total population study. *Research in Developmental Disabilities*, *22*, 77-93.

Erbas, D., Tekin-Iftar, E., & Yucesoy, S. (2006). Teaching special education teachers how to conduct functional analysis in natural settings. *Education and Training in Developmental Disabilities*, 4*1*, 28-36.

Feldman, M., & Dalrymple, A. (1984). Staff training using instructional and management strategies. In J.M. Berg (Ed.), *Perspectives and progress in mental retardation*: *Volume 1*. Baltimore, MD: University Park Press.

Foster, S., & Mash, E. (1999). Assessing social validity in clinical treatment research issues and procedures. *Journal of Consulting and Clinical*

Psychology, *67*, 308-319.

Gammon, D., Sorlie, T., Bergvik, S., & Sorensen Hoifodt, T. (1998). Psychotherapy supervision conducted via videoconferencing: A qualitative study of users' experiences. *Nordic Journal Psychiatry*, *52*, 411-421.

Gersten, R., Vaughn, S., Deshler, D., & Schiller, E. (1997). Factors enhancing sustained use of research-based instructional practices. *Journal of Learning Disabilities*, *33*, 445-456.

Grey, I., Honan, R., McClean, B., & Daly, M. (2005). Evaluating the effectiveness of teacher training in applied behaviour analysis. *Journal of Intellectual Disabilities*, *9*, 209-227.

Hanley, G., Iwata, B., & McCord, B. (2003). Functional analysis of problem behavior: A review. *Journal of Applied Behavior Analysis*, *36*, 147-185.

Harchik, A., Sherman, J., Hopkins, B., Strouse, M., & Sheldon, J. (1989). Use of behavioral techniques by paraprofessional staff: A review and proposal. *Behavioral Residential Treatment*, *4*, 331-357.

Hastings, R. (1996). Staff strategies and explanations for intervening with challenging behaviours. *Journal of Intellectual Disability Research*, *40*, 166-175.

Hastings, R. (2005). Staff in special education settings and behaviour problems: Towards a framework for research and practice. *Educational Psychology*, *25*, 207-221.

Hastings, R., & Brown, T. (2002). Coping strategies and the impact of challenging behaviors on special educators' burnout. *Mental Retardation*, *40*, 148-156.

Hetzroni, O., & Roth, T. (2003). Effects of a positive support approach to enhance communicative behaviors of children with mental retardation who have

challenging behaviors. *Education and Training in Developmental Disabilities*, *38*, 95-105.

Hill, C., & Dagnan, D. (2002). Helping, attributions, emotions, and coping style in response to people with learning disabilities and challenging behaviour. *Journal of Learning Disabilities*, *6*, 363-372.

Hilty, D., Luo, J., Morache, C., Marcelo, D., & Nesbitt, T. (2002). Telepsychiatry an overview for psychiatrists. *CNS Drugs*, *16*, 527-548.

Horner, R., Carr, E., Strain, P., Todd, A., & Reed, H. (2002). Problem behavior interventions for young children with autism: A research synthesis. *Journal of Autism and Developmental Disorders*, *32*, 423-446.

The Individuals with Disability Act of 1990. 20 U.S.C. §§ 1400.*et seq.*

The Individuals with Disabilities Act Amendments of 1997, Pub. L. No. 17-105, § 101, 111 Stat. 37 (1997).

The Individuals with Disabilities Education Improvement Act of 2004, Pub. L. No. 108-446, § 101, 118 Stat. 2647 (2004).

Iwata, B., Dorsey, M., Slifer, K., Bauman, K., & Richman, G. (1994). Toward a functional analysis of self-injury. *Journal of Applied Behavior Analysis*, *27*, 197-209. (Reprinted from *Analysis and Intervention in Developmental Disabilities*, *2*, 3-20, 1982).

Iwata, B., Wallace, M., Kahng, S., Lindberg, J., Roscoe, E., Conners, J., et al. (2000). Skill acquisition in the implementation of functional analysis methodology. *Journal of Applied Behavior Analysis*, *33*, 181-194.

Jahr, E. (1998). Current issues in staff training. *Research in Developmental Disabilities*, *19*, 73-87.

Johnston, S., & O'Neill, R. (2001). Searching for effectiveness and efficiency in conducting functional assessments: A review and proposed process for

teachers and other practitioners. *Focus on Autism and Other Developmental Disabilities*, *16*, 205-214.

Kates-McElrath, K., Agnew, M., Axelrod, S., & Bloh, C. (2007). Identification of behavioral function in public schools and a clarification of terms. *Behavioral Interventions*, *22*, 47-56.

Kazdin, A. (1982). *Single-case designs: Methods for clinical and applied settings*. New York: NY: Oxford University Press.

Kehle, T., & Bray, M. (2004). Commentary: Current perspectives on school-based behavioral interventions: Science and reality of the classroom. *School Psychology Review*, *33*, 417-420.

Kiernan, C., & Kiernan, D. (1994). Challenging behaviour in schools for pupils with learning difficulties. *Mental Handicap Research*, *7*(3), 177-201.

Kirkwood, K., Peck, D., Bennie, L. (2001). The consistency of neuropsychological assessments performed via telecommunication and face to face. *Journal of Telemedicine and Telecare*, *6*, 147-151.

Koegel, R., Russo, D., & Rincover, A. (1977). Assessing and training teachers in the generalized use of behavior modification with autistic children. *Journal of Applied Behavior Analysis*, *10*, 197-205.

Kurtz, P., Chin, M., Huete, J., Tarbox, R., O'Connor, J., Paclawskyj, T., et al. (2003). Functional analysis and treatment of self-injurious behavior in young children: A summary of 30 cases. *Journal of Applied Behavior Analysis*, *36*, 205-219.

Kuzel, A. (1992). Sampling in qualitative inquiry. In B.F. Crabtree & W.L. Miller (Eds.). *Doing qualitative research* (pp. 31-44) (Research Methods for Primary Case Series, Vol. 3). Newbury Park, CA: Sage.

Lang, M., & Fox, L. (2003). Breaking with tradition: Providing effective

professional development for instructional personnel supporting students with severe disabilities. *Teacher Education and Special Education*, *26*, 17-26.

Ludlow, B., & Duff, M. (2002). *Webcasting: A new technology for training special educators in rural areas*. (Report No. RC 023 428). (Available from the ERIC Document Reproduction Service No. ED463126).

Machalicek, W., O'Reilly, M., Beretvas, S., Sigafoos, J., & Lancioni, G. (2007). A review of interventions to reduce challenging behavior in school settings for students with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *1*, 229-246.

Machalicek, W., O'Reilly, M.F., Chan, J., Rispoli, M., Davis, T., Sigafoos, J., et al. (in press a). Using videoconferencing to conduct functional analysis of challenging behavior and develop classroom behavior support plans for students with autism. *Education and Training in Developmental Disabilities*.

Machalicek, W., O'Reilly, M.F., Chan, J., Rispoli, M., Lang, R., Davis, T., et al. (in press b) Using videoconferencing to support teachers to conduct preference assessments with students with autism and developmental disabilities. *Research in Autism Spectrum Disorders*.

Mancina, C., Tankersley, M., Kamps, D., Kravits, T., & Parrett, J. (2000). Brief report: Reduction of inappropriate vocalizations for a child with autism using a self-management treatment program. *Journal of Autism and Developmental Disabilities*, *30*, 599-606.

McClintock, K., Hall, S., & Oliver, C. (2003). Risk markers associated with challenging behaviors in people with intellectual disabilities: A meta-analytic study. *Journal of Intellectual Disability Research*, *47*, 405-416.

McGill, P., Bradshaw, J., & Hughes, A. (2007). Impact of extended education/training in positive behaviour support on staff knowledge, causal attributions and emotional responses. *Journal of Applied Research in Intellectual Disabilities*, *20*, 41-51.

Monnier, J., Knapp, R., & Frueh, B. (2003). Recent advances in telepsychiatry: An updated review. *Psychiatric Services*, *54*, 1604-1609.

Moore, J., & Fisher, W. (2007). The effects of videotape modeling on staff acquisition of functional analysis methodology. *Journal of Applied Behavior Analysis*, *40*, 197-202.

Mortenson, B., & Witt, J. (1998). The use of weekly performance feedback to increase teacher implementation of a pre-referral academic intervention. *School Psychology Review*, *27*, 613-627.

Mueller, M., Edwards, R., & Trahant, D. (2003). Translating multiple assessment techniques into an intervention selection model for classrooms. *Journal of Applied Behavior Analysis*, *36*, 563-573.

Murphy, G., Beadle-Brown, J., Wing, L., Gould, J., Shah, A., & Holmes, N. (2005). Chronicity of challenging behaviours in people with severe intellectual disabilities and/or autism: A total population sample. *Journal of Autism and Developmental Disorders*, *35*, 405-418.

Murphy, G., Hall, S., Oliver, C., & Kissi-Debra, R. (1999). Identification of early self-injurious behavior in young children with intellectual disability. *Journal of Intellectual Disability Research*, *43*, 149-163.

The National Research Council. (2001). In C. Lord & J.P. McGee (Eds.), *Educating Children with Autism*. Washington, DC: Committee on educational interventions for children with autism, Division of Behavioral and Social Sciences and Education, National Academy Press.

Nelson, J., Roberts, M., Rutherford, R., Mathur, S., & Aaroe, L. (1999). A statewide survey of special education administrators and school psychologists regarding functional assessment. *Education and Treatment of Children*, *22*, 267-279.

Ntinas, K., Asteriou-Yerofoka, S., Yiannaros, V., Koutsouridis, I., Nanna, A., & Papadimitriou, C. (2007). Greek special educators' behavior analytic kills. *Behavioral Interventions*, *22*, 153-164.

Odom, S., Brown, W., Frey, T., Karasu, N., Smith-Canter, L., & Strain, P. (2003). Evidence based practice for young children with autism: Contributions for single-subject design research. *Focus on Autism and Other Developmental Disabilities*, 10, 166-175.

Oliver, C., Murphy, G., & Corbett, J. (1987). Self-injurious behaviour in people with mental handicap: A total population study. *Journal of Mental Deficiency Research, 31*, 147-162.

Olson, R., Laraway, S., & Austin, J. (2001). Unconditioned and conditioned establishing operations in organizational behavior management. *Journal of Organizational Behavior Management*, *21*, 7-36.

O'Neill, R., Horner, R., Albin, R., Sprague, J., Storey, K., & Newton, J. (1997). *Functional assessment and program development for problem behavior: A practical handbook* (2nd ed.). Belmont, CA: Wadsworth.

O'Reilly, M., Renzaglia, A., Hutchins, M., Koterbra-Buss, L., Clayton, M., Halle, et al. (1992). Teaching systematic instruction competencies to special education student teachers: An applied behavioral supervision model. *JASH*, *17*, 104-111.

Parsons, M., Schepis, M., Reid, D., McCarn, J., & Green, C. (1987). Expanding the impact of behavioral staff management: A large-scale, long term

application in schools serving severely handicapped students. *Journal of Applied Behavior Analysis*, *20*, 139-150.

Patton, M. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.

Phillips, J. (1998). Applications and contributions of organizational behavior management in schools and day treatment settings. *Journal of Organizational Behavior Management*, *18*, 103-129.

Reichle, J. (1990). *National working conference on positive approaches to the management of excess behavior: Final report and recommendations*. Minneapolis, MN: Institute on Community Integration, University of Minnesota.

Reid, D., & Green, C. (1990). Staff Training. In J.L. Matson (Ed.), *Handbook of behavior modification with the mentally retarded* (pp. 71-90). New York: Plenum Press.

Reid, D., Parsons, M., Lattimore, P., Towery, D., & Reade, K. (2005). Improving staff performance through clinician application of outcome management. *Research in Developmental Disabilities*, *26*, 101-116.

Repp, A., Felce, D., & de Kock, U. (1987). Observational studies of staff working with mentally retarded persons: A review. *Research in Developmental Disabilities*, *8*, 331-350.

Safran, S., & Safran, J. (1988). Perceptions of problem behaviors: A review and analysis of research. In R.B. Rutherford, C.M. Nelson, & S.R. Forness (Eds.), *Bases of severe behavioral disorders in children and youth* (pp. 132-138). Boston: College-Hill.

Scheuermann, B., Webber, J., Boutot, A., & Goodwin, M. (2003). Problems with

personnel preparation in autism spectrum disorders. *Focus on Autism and Other Development Disabilities*, *18*, 197-206.

Scott, T., & Nelson, C. (1999). Using functional behavior assessment to develop effective intervention plans: Practical classroom applications. *Journal of Positive Behavior Interventions*, *1*, 242-251.

Scotti, J., Evans, I., Meyer, L., & Walker, P. (1991). A meta-analysis of intervention research with problem behavior: treatment validity and standards of practice. *American Journal on Mental Retardation*, *96*, 233-256.

Seligson Petscher, E., & Bailey, J. (2006). Effects of training, prompting, and self-monitoring on staff behavior in a classroom for students with disabilities. *Journal of Applied Behavior Analysis*, *39*, 215-226.

Shore, B., Iwata, B., Vollmer, T., Lerman, D., Zarcone, J. (1995). Pyramidal staff training in the extension of treatment for severe behavior disorders. *Journal of Applied Behavior Analysis*, *28*, 323-332.

Sturmey, P. (1998). History and contribution of organizational behavior management to service for persons with developmental disabilities. *Journal of Organizational Behavior Management*, *18*, 7-32.

Tousignant, M., Boissy, P., Corriveau, H., & Moffet, H. (2006). In home telerehabilitation for older adults after discharge from an acute hospital or rehabilitation unit: A proof-of-concept study and costs estimation. *Disability and Rehabilitation: Assistive Technology*, *1*, 209-216.

Walker, H. (2004). Commentary: Use of evidence-based interventions in schools: Where we've been, where we are, and where we need to go. *School Psychology Review*, *33*, 398-407.

Wallace, M., Doney, J., Mintz-Resudek, C., & Tarbox, R. (2004). Training

educators to implement functional analyses. *Journal of Applied Behavior Analysis*, *37*, 89-92.

Watson, T., Ray, K., Sterling Turner, H., & Logan, P. (1999). Teacher-implemented functional analysis and treatment: A method for linking assessment to intervention. *School Psychology Review*, *28*, 292-302.

Weber, K., Killu, K., Derby, M.K., Barretto, A. (2005). The status of functional behavioral assessment (FBA): Adherence to standard practice in FBA methodology, *Psychology in the Schools*, *42*, 737-744.

West, E., Jones, P., & Stevens, D. (2006). Teachers of students with low incidence disabilities talk about their own learning: An international insight. *Research and Practice for Persons with Severe Disabilities*, *31*, 186-195.

Zarate, C., Weinstock, L., Baer, L. (1997). Applicability of telemedicine for assessing patients with schizophrenia: Acceptance and reliability. *The Journal of Clinical Psychiatry*, *58*, 22-25.

VITA

Wendy Ann Machalicek was born in West, Texas on January 24, 1977. She is the daughter of Jimmy and Linda Machalicek. After graduating from Robinson High School in 1995, she attended the University of North Texas, Denton, where she earned a Bachelor of Science in Biology in 2000. Between 1997-2006, she worked in social service organizations serving persons with intellectual disabilities and autism spectrum disorders in various capacities including service coordinator, preschool teacher and respite care director. She earned a Master of Education in Special Education in 2004 from The University of Texas at Austin. In the fall of 2004, she entered the doctoral program in special education at The University of Texas at Austin. She was the 2008 recipient of the American Association on Intellectual and Developmental Disabilities student award. She has co-authored a number of peer-reviewed articles and several book chapters in the field of intellectual disabilities and autism spectrum disorders.

Permanent Address: 429 Wildwood Trail Lorena, TX 76655

This dissertation was typed by the author.